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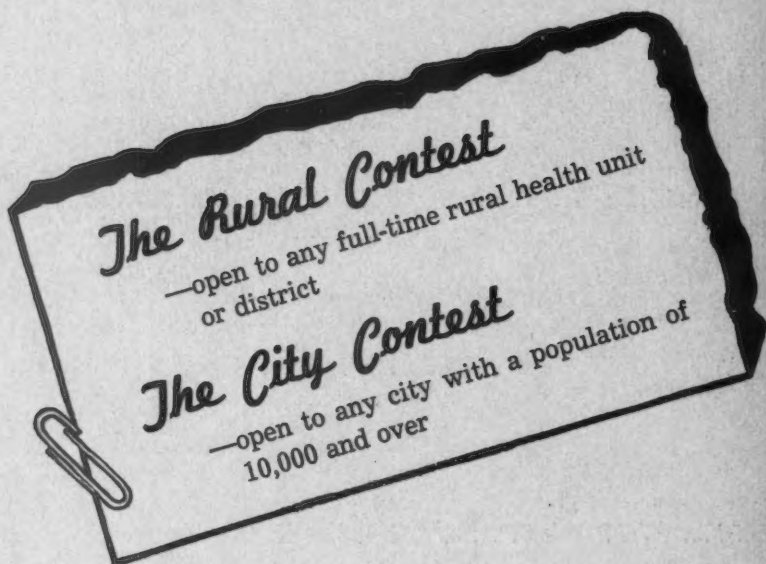
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RECLAMATION OF AGAR

HILDA G. MACMORINE

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The 1942 Canadian Health Conservation Contests



The Purpose of the Contests:

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Health Services in the Secondary Schools*

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A TOTAL school health program aims at the development of healthy, vigorous, keen, wholesome and responsible young citizens, without physical defect, of good health knowledge, habit and attitude, and capable of self-direction in the maintenance of an optimal state of well-being. In a word, the objective is physical and mental normalcy for age and capacity.

The ultimate fulfilment of this objective belongs in very large measure to adolescence. The continuing school health program, i.e., the secondary program, calls for much change in perspective and procedure, change ranging from the simple to the radical. *The passage of responsibility for health from one authority to another provides a new nucleus of effort.* Basically, the advance in the intelligence level must be taken into consideration. The staff must rise to the occasion, since the approach to the problem and the conduct of the program must now reach to, and proceed along, a much higher plane. The previous program, from infancy through the pre-school and primary school phases, will have influenced the general destiny of the school population, but in no case is it possible to satisfy the needs of adolescents by reliance alone upon past effort. Why the official program comes to a stop, as it does in so many communities, short of the secondary school, is at once an interesting question.

Local reaction to the question varies, but for practical purposes most of it may be sorted to one or more of a few brackets. A clearly sustained sense of the insufficiency of the local elementary school health program is reason enough to defer, but not to postpone indefinitely, the obligation to adolescence. There is no short-cut to the secondary school health program, and initial duty is manifest. One thinks next of instances where secondary schools have not been given the

*Presented at the thirty-first annual meeting of the Canadian Public Health Association, held in Toronto June 1-3, 1942, in conjunction with the twenty-eighth annual conference of the Ontario Health Officers Association.

thought they deserve. "Sitting tight" on past or past-present gains may have served to bridge the crises of years of depression or of comparable local circumstance, but as a fixed position it is plainly out of harmony with the forward trend of preventive medicine. The subject of finance is always to be reckoned with. There may be something left of the old attitude which asks where the public program shall end and where gratuitous service shall cease, but that attitude is becoming much less common. Restraint naturally surrounds public funds and economy continues for the time to hold the edge on the newer "bills of health rights". Happily, outlay on adolescence is capable of meeting both of the criteria; it is insurance on past and future commitments. The fact of the matter is that adolescence has not been championed as it should be, responsibility is being shelved and precious opportunity lost, mainly because there has been delay in the development of the conviction that, unless health supervision is continued past the primary school, the money already spent will not be fully realizable, and adulthood will continue to lay unnecessary expense at the public door. This last statement would seem beset by the limitations imposed by the reduced enrolment of the higher school, but it can be shown to be true of any representative portion. A generation or thirty years ago, when only 10 per cent of those eligible entered upon secondary education and when school health service as a whole looked mostly to the future, one would hardly have proposed the project. To-day, however, enrolment has advanced to 30 per cent in portions of the Dominion and to a much higher point in many urban centres and there is acceptance of the protective and preventive measures of public health and school medicine as a corollary of educational facilities. Progression of education, wider use of its facilities, and the compulsory aspects of attendance have effected a great change. The challenge is as clear as it will be for some time. Based on the primary program and using the existing set-up, a health service for the secondary school need not cost in excess of 1 per cent* of that of education and can, in fact, be had for less. Any cry of class privilege is rejectable, for it is no more logical that if directed at free education. The problem in its final analysis is one of overcoming the inaction of the past and this can take place in direct proportion to the numbers receiving secondary learning. Even though the direct beneficiaries be in the minority, the leaven capable of influencing the total group will be of inestimable value. To those who emerge intellectually and physically strong we must look in large part for the benefits which in the course of time will accrue to many or all.

There is much evidence of quickening of public thought on school affairs generally. With public health spending quite liberally on personal service to the close of the primary school age, there has been a willingness in the past to look back upon work well done—the acute communicable disease period is over with, the great assortment of remediable defects in large part attended to, and the foundations of health habit and practice reasonably well established. Public opinion to-day is more constructively interrogative and more assertive.

**Based on an approved annual per-pupil outlay of \$2.00 as compared with the 1941 cost of secondary school education in Toronto—\$190.00 (approximately) per pupil in average attendance.*

Among other things it earnestly asks concerning its duty to the age which is approaching adulthood; concerning the capacity of the group to receive the reins of health self-government; concerning the more insidious and chronic species of defect now threatening; concerning the universal emotional disturbances of adolescence in which it has come to see more than the inevitable thorny path of individual evolution and experience. These are matters which informed parents in particular, singly and in organized groups, are becoming increasingly concerned about. Added to this we have with us now, as never before, the urge to consider the emergent economy of the race, all other considerations to one side. Heretofore we have looked with more or less complacency upon what we lightly thought an age of statistical favour, the teen age. We have no right to such a concept. It has been shown that 40 per cent of draft recruits for the American Armed Forces have had to be rejected for medical or mental inadequacy, or both. The official Canadian figure has been quoted at 42 per cent. Quite recently the Chief of the Air Staff, R.C.A.F., Ottawa, through the statistician of the Force, provided most valuable information in respect of examination of enlistees over a late three-month period. Grateful acknowledgment is made of the privilege to release these figures. The observation of greatest worth at the moment is the one which deals with rejections in prospective aircrew, a section of the service most representative of the manpower derived from the secondary schools of the Dominion and the continent. Permanent rejection amounts to 15.8 per cent and temporary rejection to 17.5 per cent. The final net rejection is placed at 25 per cent.* It is a circumstance such as this which, no doubt, has prompted the Minister of Health of Ontario to issue an appeal to municipalities to give serious consideration to the inception of secondary school health services. From across the sea comes the recent word that the civil focus of English attention is on the young as never before, the young of rich and poor alike; that, for one thing, there will be no real slums in the England of the future. National economy is deepening its roots in the public services and humanities. Surely the time has come in this country for less of pussy-footing on essential services, for less of the song and dance around the almighty dollar. Patience is being severely tried. Right it is that we should spare every dollar we can for the material war effort. But, crudely put, we also have to feed the machine with young men and women. Beyond that, with the struggle over, we must have people, sound of body and, particularly, *sound of mind*, to play a part in the establishment of an order which will make the recurrence of war less likely. Can we get closer to a case for the secondary school age and the problem which it places in our laps?

Discussion now turns to the services themselves, contemplated, proposed, or under review.

1. *The Scope and Magnitude of the Program.*

We recall the five elemental aims: physical health, knowledge, habit, attitude,

*Admittedly, examination is severe but, it is believed, this is offset by an initial pre-selection by the group itself.

and self-direction—the fifth a culmination. In a secondary-school program, unless the first four are proportionately stressed, the program lacks balance, and the accrued value of number five suffers, in greater amount, in fact, than the degree of imbalance would seem to indicate. This is a serious loss when operating in the field which precedes by only a few years the adult phase. If the official program is so poorly subsidized that it cannot make the five-fold gain, it might as well remain out of the field. If it can make a reasonable impression, let it do so, but let it keep all files well dressed at the front rank. Neither shortage of funds nor grooved interest is sufficient reason to advance one objective to the detriment or exclusion of others. The end-product will fail.

2. The Translation of Responsibility for Personal Health.

As already intimated, there comes a time in the life of the human organism when responsibility changes hands, and very definitely. This is somewhere in the period of adolescence, deviating from the mean one way or the other within a few years. For optimal health and self-direction the transfer should be a translation. To live health is similar to speaking a language. The learner has to take part and in time think and act in the language. The analogy includes the idioms, too. There is no particular criticism to offer of didactic effort during the weekly or semi-weekly period devoted to health and hygiene, but unless each day, or each hour, in the class room and out, the potential value of health opportunity at existing interest levels is accepted or developed, health behaviour will be no more easily acquired than will perfect, spontaneous language.

3. Personnel Participation.

In the impartation of the health attitude to the adolescent, very few indeed of the members of the faculty can excuse themselves legitimately from sharing in the responsibility. To say that they have little time is more defensible than that they have little part to play. We look with dismay upon the disrespectful conduct, insolence at times, of a part of the student body towards its teachers. Surely this is not a natural consequence of the urge towards self-expression as fostered by the newer system of teaching. Whatever the cause may be in the main, home training or other factors, it occurs to one that considerable of better conduct might be retrieved by well-directed teacher interest paralleling that of the student. A study in Michigan high schools has revealed that there are fifteen each of prominent problems and interests aside from the acquisition of learning. Health stands second in both classifications, being superseded only by money as a problem and recreation as an interest. In the older adolescents of college grouping, health stands first as an interest, which is to be interpreted as a realization, at a time when the intelligent individual stands on the threshold of maturity, that of all considerations poor health is the one which will most militate against success. Yes, all on the staffs of our high schools and colleges have a part to play, the caretaker included.

4. The Sanitation of the School Plant.

Required by law as a safety measure, the sanitation of school premises has

another contribution to make. Environment plays a large part in human reaction and behaviour, particularly so at the formative age. The concepts of cleanliness, orderliness, good ventilation, adequate lighting, out-of-door living values, etc., are easily prostituted if precept is violated by example. Certain portions of the school plant in particular are of vital influence, good or bad—the wash-room and the cafeteria. Spitting, throwing paper about, non-flushing, are easily engendered if the conditions in the wash-room are unsatisfactory. As another example, I can conceive of no greater affront to intelligence than to be taught the habits of the fly in the zoology lesson and to have to eat in a school dining-room with hundreds of the pest. Cynicism is easily bred and needs no ill-chosen contribution by the school.

5. *Provision for Physical Examination.*

It is well-nigh impossible to think of a school health service without provision for routine physical examination by the school medical staff, or an equivalent. The alternative is mentioned because it is the practice in some communities to feature examination by the family physician, reserving staff time for those of indigent or dissenting families. Secondary schools lend themselves to this method better than do elementary. The basis of such a course is two-fold, (1) to save cost and incidentally to hope for greater frequency of examination, (2) as conceived by certain authorities, to introduce if possible into the life of the pre-adult the type of examination which it is proposed he become accustomed to, complete in detail and in a doctor's office, and which, it is felt, he has to arrange for and go after—a lesson in responsibility and self-direction. There is much to be said in favour of the practice. At its inception it will be found to thrive best among the better-to-do although it has been submitted that it will gather momentum in all but the lower income brackets. For the time being, however, most public programs are geared one way or another to the total potential load at a given level or levels.

This raises the questions of frequency and of circumstance of examination, and of the purpose to be served by the unit of examination. Ideally one would examine annually but this is possible in very few, if any, comprehensive health programs on this continent. Research has endeavoured to locate, if they exist, the age groups best served by examination. The answer has come back that there is no better measure than the simple arithmetical. It is a truism that it profits no one, whether the examination is made daily, yearly or otherwise, if nothing or little is done about remediable defects. This implies infinitely more than mere communication of the facts. Follow-up is vital, in the home, through the pupil, *with the pupil*, and must include associated care within the walls of the class-room and building. The frequent rapid examination without history, without nurse-teacher observations, in a word without background, is of less value than a less frequent physical examination carefully prepared and consummated, and made the occasion for genuine health teaching. High frequency is one of the disturbers of thoroughness. There must, of course, be a minimum of examinations and this suggests one soon after entrance to secondary school and

one again before leaving or graduation. The first of these will be in either the first or second form, where enrolment is at its height. It should be of good quality, for its own sake and for its favourable influence on the subsequent load in terms of volume and the directional accuracy imparted to follow-up. The later or second examination has a different value. The examination may not be necessary if the pupil leaves school soon after the first—another good reason for the thoroughness and fulness of the first. Where, on the basis of spacing, the second examination is made, one must sense that here, except in the case of those who go on to higher learning, is perhaps the last opportunity under existing or similar auspices to examine, to advise on residual abnormality, and to foster an appreciation of the future values of periodic health examination. What of the time which intervenes between examinations? Apart from direction resulting from the first examination, the answer is one of a sharpening of observational skill by all the staff. To this end contact between doctor, nurse and teaching staff can hardly be overdone. The physical-education teachers are the key personnel. Nevertheless, any deviation from the usual appearance or action of a pupil (the word "normal" may as well be dismissed from present nomenclature) should occasion reference *by any and all teachers* to the nurse or physician, even if the pupil had a routine examination the previous day. The special physical examination is an essential part of the service. *The total number and type of "specials" referred by staff, and the percentage accuracy of selection as shown in resultant examinations, furnish one of the best indices of the effectiveness of the total health machinery of the school.*

In the program of minimum or modest proportions it may be found that assessment for physical training and especially for strenuous competitive sport will make a bid strong enough to prejudice or threaten isolation of other interests. This must be judiciously dealt with. Regarding the case for major competitive sport, there is no escape from more frequent examination than ordinarily is given to all. As for other activities, one should not depart too far from a primary position which assumes that any given interest must bow in appropriate degree to the objective in its entirety. A total health service, operating on a sound, comprehensive basis, is bound to rob the hazard of physical training of most of its sting. I find it difficult to conceive of a physical training program so constituted as to require unalterably a meticulous annual appraisal of physical tolerance. I am inclined to think that such is not the case. True, there have been accident-casualties on the field or in the gym which some would debit to the absence of annual physical examinations but we have also had accidents in pupils duly examined once, twice, or oftener. I suggest that it is possible to rely too much on the isolated physical examination. We must, therefore, establish a reasonable alternative. It will come through the carrying forward of vital information from the elementary school, the routine examination already referred to and its preparatory history; through the recording of incidents, through observation, ever-present and operating with precision, with free use of the special physical examination. By and large a well-planned program is capable of meeting the issue.

The scope of the routine physical examination is not to be left to chance or choice. Theoretically, every part of the body should be assessed. The examination should include taking of blood pressure, urinalysis, and, on occasion, the haemoglobin test. Such scope favours the family physician plan and in the public program will be governed by the personnel available. In any case, the minimum procedure must include the exercise test for heart, chest examination, careful vision and hearing testing, and thorough appraisal of posture and its extreme manifestation, orthopaedic defect. These stand out as essentials with respect to adolescents. Added measures may have to depend on history or other indication. Attention must be given, at shorter intervals, to such items as weight, height, and vision and hearing. Much of this work can be done by the nurse or the school staff.

A desirable determination in adolescence is tuberculin-testing with X-raying of those who are positive. Early case search is most productive in those fifteen years and up. Preventive action, on the other hand, may take place appropriately from the day of infection, which may be any time. In applied terms, however, a secondary school service should try to test all pupils at least once. This may be done in one of two ways: an initial en masse project continuing with those who enter, or a long-range project which confines itself to incoming students. Those who are positive on X-ray examination will in any case be dealt with appropriately. The parents of those who are test-positive, X-ray-negative, should receive a clear statement of the significance of the situation, including advice as to subsequent supervision; to this the school will add its continued observation. This would seem a minimum program, to which one might add the re-examination, before they leave school, of those who are negative. By way of policy, one further item will need consideration, namely, a plan for X-raying and provision for payment as between parents and school.

Immunization procedures, such as those in prevention of smallpox, diphtheria and scarlet fever, are not to be overlooked, but will be related to prevailing policy and practice, particularly to the earlier program and its reinforcement phases.

6. *A Dental Program.*

In elementary schools dental service may be found to go to any length, even to the provision of clinics in schools for operative work and extraction. Rationale is based upon the recurrent nature of defect in deciduous teeth and on the difference and indifference of parental attitude towards temporary teeth and, for that matter, towards the early permanents. Belatedness of interest of the dental profession during years past has played its part also. As for secondary schools, it is not proposed to offer the principle of treatment in the school. Defect finding, however, is essential and suggests an annual survey of the teeth of all students, notification to parents, and assiduous follow-up aimed at correction. Treatment facilities will have to be sought for those of meagre means but more generally dental care should be stressed as a matter of personal responsibility. It is distressing to witness the dental breakdown among those in the late teens and early

twenties. It is noteworthy that the relationship between nutrition and dental defect and caries is as fine an example as we have of the interchangeability of cause and effect. For these reasons dental health should be given particular prominence in the teaching program.

7. The Health-Teaching Program.

No one will refute the assertion that, whereas most subjects compete for the interest of students and resolve themselves upon interest levels, health cannot be left to this fate. The greatest business of all is to be healthy. Consequently effort should be expended to remove it from competition and to make it a sustained interest, ingrained, and expressing itself in self-direction in all its phases. Position in the curriculum is fundamental; it gives status to the subject and furnishes the necessary scientific foundation for interest, attitude and conduct. Position, however, should not suggest that health is an isolated subject, a subject to be taught in vacuum. It requires more animus than does any other subject; more of the practical, more avenues of presentation, more opportuneness than time-table. For long I have felt that the teaching day contains innumerable potentialities for health teaching. Among the subjects of lesser opportunity I can really conceive of mathematics turning on the odd occasion to the statistical graph, its compilation and interpretation; of history and geography having some regard for the romance of medicine and places of epidemiological struggle and conquest. There are many classics on health suitable to the English hour. Certainly more of oral composition could be given to this engaging topic. More library interest could be built around health literature and books, as such, or for the purpose of reference for fulfilment of class-room and laboratory work. Class projects might well embrace more of the matters of health. Greater interest in the meaning of the simple every-day adjustments we make in person or environment could be provoked. These experiences and many more of a similar sort seem to me to be the desirable adjunct of formal health teaching, however interesting one may make it.

Students of education are beginning also to focus considerable attention on the content of certain other teaching areas where a natural interest prevails at a level close to or associated with health—home economics, the sciences, civics, and physical education. One need say little of the last-named. It has been well pointed out, however, that home economics and the sciences are capable of a greater contribution by way of choice and technique. Many simple examples of applied physiological hygiene lie within the scope of the lecture room and laboratory. Civics could afford to give more of major attention to organized facilities by governments and agencies for health and its allied conditions.

Of the issue, precept versus example, as it affects the teaching staff, little need be said. No one wishes to be a kill-joy, but one has the right to submit that in the relationships between elders and juniors it is reasonable to expect moderation and common sense in all things. We are more concerned in larger issues—school practice as a whole in relation to its teaching. I recall the reference to flies in the cafeteria. To this one can add hand-washing versus

the facilities for it; the lesson on the common cold versus the continuance at school of the teacher with a cold. One could go on indefinitely. Going beyond the school, we note with disturbance and chagrin the spurious claims of advertising. The school has nothing to do with this, we may say; it will continue, however, so long as business thrives at the expense of an ever-renewed adulthood coming out of our schools possessed of considerable reason to have branded much of teaching as just so much "hokey". One of the reasons health education and practice lag is this element of inconsistency.

The part of the doctor and the nurse in health teaching need not be unduly enlarged upon. The opportunity to teach is associated with all circumstances which bring together, in varied combination, doctor, nurse, school staff, students, and parents. These occasions will become numerous if properly developed and cultivated. Much of the busy doctor's contribution will consist of examination, consultation, and conference. His ingenuity, however, will open other paths and the more time that is made available to him for communication and co-operation with the staff, the greater will be his influence in the realm of instruction. The nurse's opportunities are more varied from the outset and will be contingent upon the development of valid contacts such as come to her, which in the course of time will be legion. Every contact presents a teaching opportunity, however small. Occasional class-room teaching should not be removed from her. Such teaching is a special art; so is sensing local problems and knowing current thought in matters of health. Bring the two together from time to time and one has a perfect combination. Let teacher and nurse hear each other in action. Technique and content will cross, to the mutual benefit of both; the student body will profit and will be impressed by the unity of objective and effort.

8. *Attention to Difficulties of Adaptation—Emotional Disturbances of Adolescence.*

Call this mental hygiene if one will. It is psychological service. Since the secondary-school pupil is usually academically prepared, such a service will be spared many of the problems generally attributable to retardation. The character of the problem varies with the levels of development rather than age, and the absence of a problem in the career of the individual adolescent is rare indeed. The first-former will face the difficulties of a new environment. The security of the smaller school, with the same classroom day after day, is gone, his responsibilities increase, the appointment with teachers rotates, and generally he may spin with things. Demands upon his day are more strenuous and varied. He gets less sleep and rest than he has been accustomed to and everything seems askew. Surely he needs help. As physical and mental growth advance with secondary physiological changes, the adolescent may experience emotional confusion. Disparity in age and development, one way or the other, may haunt him. More generally, a hostile world full of change in custom and conduct stands before him. Inhibitions will be present, urge is innate and may overwhelm. He may shrink from things; he may plunge to be submerged. We may wonder that so many come through unscathed with the little supervision and

health knowledge they have received; we have no reason to be critical of those who break down if we have stood aside. A health service must recognize the situation and not spend itself wholly on the more puerile activities of the primary school. The adolescent, however boisterous, seemingly confident or repellent of advice, will succumb to and shake the hand of the understanding friend and open-minded listener. To provide such a facility is not so easily done as said. It must, however, be an integral part of an official secondary school health service. It implies a unison of effort, to be headed by the doctor and his assistant, the nurse, with propagation through the ranks. It is a consultative feature of the service, although one must warn against any obviousness of reference in the cases which appear to resent advice. The "problem hero" is a false creation. Let those who seek help come freely. For the other kind, the subtle, friendly, purposeful contact, not made too often and rotated through personnel, will bring the better result. The apparently insoluble case may need the services of a psychiatrist. Fortunate is the service which has attached to it a division of mental hygiene. Failing this, a consultant in psychiatry should be available on occasion.

9. *Attention to Postural Defect.*

The apparent wide-spread prevalence of postural defects in secondary school pupils is a most engaging question. To begin with, it is quite obvious that something more should be done in the field of early detection and modest correction in the elementary schools. All things have beginnings and postural defects are no exception. It seems a good idea to use the trained physical education staff of secondary schools, on a scheduled basis, for guidance and direction in nearby elementary schools. This would undoubtedly favorably affect the later problem, in incidence and in terms of degree on discovery.

Posture training is in order under all circumstances. Corrective exercises, however, should be given only after over-activity, malnutrition or chronic fatigue have been controlled and eliminated, and body tone restored. On the question of advanced remedial work in school, a conclusive opinion has not yet been fully arrived at.

10. *The Health Conference.*

Every occasion of complete or special physical examination, every getting together for a purpose which demands study and plan, will or can qualify as a health conference. Aside from time set part for work of a more or less pre-arranged character, one should provide regular periods for conference between interested parties, *in the health service suite*. To this place would come the principals in any given problem. The staff alone may use the occasion for consultation and advice on a student or group problem. The pupil may appear before the nurse or the doctor, or both. He may be accompanied by parent, teacher, or both. The conference may be of his own choice or that of others. From here should emerge the plan of action or solution, *working back, and preferably on, at any rate with, the initiative of the student*, unless the conference chooses to depute responsibility otherwise.

11. *The Role of the Nurse.*

In the interests of brevity the role of the nurse is given position second to the last. Much of the nurse's function will have been gathered from that which has gone before. Inclusion of the subject would seem more or less superfluous but people are to be found—the writer has encountered them—who, granting her position within the elementary program, hold doubt concerning her liberal presence in the secondary school. Nothing could be further from the considered facts. Duty changes but is not lessened. Who, in second rank, knows preventive medicine as the nurse does? Who recognizes, or improvises for that matter, opportunity and contact for practical teaching as she does? Who, except the physician, has greater influence with parents and students and with the community in matters of health? Who is better able to interpret programs and solve problems? The nurse remains the backbone of the service and, within the wide limits of her professional status, is the most suitable proxy the physician could desire.

12. *Co-ordination of Program.*

All programs call for co-ordination and this is particularly true of a secondary school health program in which diversified objectives must be brought to focus on individuals in the process of completing education preparatory to entry upon life's struggle. In some places it is the custom to designate someone on the school staff as co-ordinator. In initiating a program the employment of such a person might be considered a luxury. In the presence or absence of such a person, however, effort must be concentrated upon bringing to bear on individual health problems the combined contribution of counsellors, administrators, teachers, physician, dentist, nurse, attendance officer, etc.

It will have been noted that the concept of health conference was held down to the proportions which encompass a problem and its handling. Even so, it presents a powerful co-ordinating force. There is another circumstance in which health and school staff meeting in pairs, groups or in entirety, will confer on the impersonally constructive and preventive aspects of the program. This type of gathering perhaps might be termed staff consultation. Another strong co-ordinator is thus present. Much of the success will accrue from mutuality of understanding, acceptance of one element by the other, and recognition of respective functions and of time and place for convergence.

In the larger sphere should sit periodically a Health Committee of the school, headed by the principal or his assistant, and including the doctor, the nurse, physical education teachers, those who represent the key instructional groups (home economics, science), and one or more form teachers. It is suggested that a representative of the Home and School Club of the school be included. The function of the committee would be to determine policy (within the limits of policy laid down in official agreement between contracting parties), to study local needs, to interpret program and enlist participation by all, to sense and record accumulated problems and to hear and adjudicate on questions, individual or group, which may properly be brought before it.

The Control of Tuberculosis in Wartime*

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TUBERCULOSIS, always a problem in peacetime, becomes an even greater one in time of war. In the reports from Europe of an increase in mortality and morbidity, we see that the present conflict is no exception to other wars. It is costly and disabling. It takes its greatest toll in those age groups so important in the war effort. Not only do we lose the service of those ill and incapacitated, but it also requires the services of those who are engaged in one phase or another of the tuberculosis program. These could well be used, though often they can ill be spared, for tasks in direct relation to the war. During wartime such increases in treatment beds that are urgently required are retarded because of difficulties in obtaining materials for construction, due to war requirements.

The fall in death rate, which has been so evident for the past quarter of a century, had occasioned in some quarters a false sense of security in regard to tuberculosis. Because we have reduced the rate from 200 per 100,000 to 50, there has been a tendency to believe that the greater part of the work has been done and that it is only a matter of time until the disease will be controlled. Nothing could be more unsound or misleading. A disease that kills nearly 6,000 of our population and leaves at least 30,000 incapacitated, and costs the country directly at least \$8,000,000 annually, is still a formidable enemy and ranks as a major public health problem.

The war has brought us back to stern reality as to the menace of tuberculosis. From Britain comes the information that the number of deaths increased from 26,000 in 1938 to 28,000 in 1940. The number of deaths from tuberculosis in males for the second quarter of 1940-41 was nearly 600 more than for the similar quarter in 1938-39; the increase in females was over 400 for the same periods. We have been in a fortunate position in Canada, so far removed from the actual theatre of war. During 1940 there was a slight decrease in the number of deaths, but there will be an increase for 1941. The war clouds may gather nearer to our shores but our tuberculosis services have gone on pretty much as usual in spite of mounting difficulties due to loss of personnel.

If we are to maintain control of tuberculosis in wartime, we must continue these services, attack the problems that arise as a result of the war, and take advantage of the case-finding projects that have been placed in our hands because of the war.

The keynote of the fight against tuberculosis, is "Find it,—treat it,—

*Presented at the thirty-first annual meeting of the Canadian Public Health Association, held in conjunction with the twenty-eighth annual conference of the Ontario Health Officers' Association, Toronto, June 1-3, 1942.

conquer it". Case-finding has always kept ahead of treatment facilities, which have been greatly inadequate, and until both are developed to a greater degree, control of tuberculosis is still hidden in the future.

TABLE I
TUBERCULOSIS CLINICS IN CANADA

	1938	1939	1940
Reports received	52	56	65
New cases	48,035	61,769	56,105
Old cases	37,667	68,529	59,274
Total	85,702	130,298	115,379
X-Rays	70,032	97,946	99,498
Fluoroscopies	13,007	18,394	29,713
Tuberculin tests	35,360	50,981	43,685
Patients receiving pneumothorax	1,209	1,375	2,081
Pneumothorax treatments	18,936	22,095	29,308

What is the extent of such facilities in Canada? A report (1) of tuberculosis clinics from all the provinces shows how extensively this service has been developed. It will be noted that during 1940, there was a reduction in the attendance at such clinics. This reduction was due to the fact that some of these services were reduced owing to loss of personnel.

The clinic work outlined in this report covers two of the most important phases of case-finding. The first is the service available for *the general practitioners of Canada* to provide the earlier diagnosis. This is still the greatest source of cases and the most important one. From this source comes the patient who already has symptoms and in whom the disease is likely to be the most communicable. It also includes the work which is being done in the examination of *contacts*,—the next greatest source of new cases. The report covers a good many surveys made on population groups. The number of these groups, which are now regularly examined, is increasing and is now a very diversified list. This indicates the progress that has been made in *the search among apparently well people* for hidden cases of tuberculosis. Beginning some twenty years ago with the examination of school children, it now includes normal schools, universities, schools of nursing, mental hospitals, miners and the examination of groups in industry. It is surprising that the examination of school teachers had not been undertaken on a more extensive scale until recently, and it is of interest to note that four provinces have undertaken to examine all school teachers during the present year. Many such services are not included in this clinic report because they have been conducted under local public health auspices and in a good many instances by industries themselves.

Two opportunities have presented themselves as a result of the war. The first is the X-ray examination of all recruits for the armed forces. This is the greatest case-finding project ever attempted in our history. Its magnitude is apparent when we realize that one in twenty-five of our population has already been X-rayed. As the war proceeds, we are surveying more and more of our young adult males. The findings are very constant, about 0.9 per cent being rejected, and about one-third of this number requiring treatment or observation. While this is a small proportion of active cases, yet, taken in the aggregate, it is of vast importance and deserves more attention than it has received. Not only has it prevented the problem of tuberculosis from becoming a burden to the army by eliminating thousands of cases of tuberculosis from breaking down under army training, but it has also made known to health authorities thousands of new cases, which would otherwise have been entirely unknown.

The Department of National Defence has co-operated well with provincial health authorities in the reporting of cases, but in some instances there is a gap between the finding of these cases and an efficient follow-up on the part of civilian tuberculosis services, and this particularly in areas where the incidence of tuberculosis has been higher than the Canadian average. This condition is further aggravated by the lack of treatment beds in these areas, so that the full benefit of such an excellent case-finding project is not being fully utilized. It is a serious matter if this tuberculosis survey of our young men is not capitalized to the fullest extent, for the benefit of these potential patients themselves and for the public safety. Here is an aggressive feature of the campaign for tuberculosis control that demands our full study and attention. Men rejected should be followed as closely as we do other tuberculosis patients and contacts.

The other wartime opportunity for case-finding is in the expansion of industrial hygiene, particularly in war industries. Some excellent projects have been undertaken. When twelve men are needed in the factory to keep one man in the field, and when loss of working time is as serious as the loss of a battle, industrial workers are as much a part of an all-out war effort as are the men in uniform. Tuberculosis is two and a half times as great in industry as in the general population. It thus becomes the serious responsibility of the industrial medical officer to protect such workers by case-finding surveys. Health officers and tuberculosis clinics have an opportunity to stimulate and render assistance in the development of such surveys. The control of tuberculosis is an important phase of industrial hygiene.

What of Canada's treatment facilities? We now see clearly the advantage enjoyed by those provinces that have been able to build up adequate treatment facilities prior to the war. Table II gives the beds available by provinces and the ratio according to the number of tuberculosis deaths in 1940.

This table is modified if the Indian deaths are excluded (Table III). The ratio for the White population of the four Western provinces is higher, but British Columbia is still below the Canadian average. It also serves to show how inadequate are the facilities of the provinces of

TABLE II
RATIO OF BEDS PER DEATH

	<i>Deaths</i>	<i>Beds</i>	<i>Ratio</i>
Canada.....	5,789	11,301	1.9
Prince Edward Island.....	56	82	1.4
Nova Scotia.....	415	597	1.4
New Brunswick.....	295	540	1.8
Quebec.....	2,503	3,503	1.4
Ontario.....	1,011	3,638	3.5
Manitoba.....	369	920	2.4
Saskatchewan.....	241	762	3.1
Alberta.....	321	409	1.2
British Columbia.....	578	850	1.4

(Calculated on 1940 deaths.)

Quebec and the Maritimes. While Quebec will have in operation another 600 beds during the year, the outlook is not good for further construction owing to the shortage of building materials.

TABLE III
RATIO OF BEDS PER DEATH
(Exclusive of Indians)

	<i>Deaths</i>	<i>Beds</i>	<i>Ratio</i>
Canada.....	4,997	11,001	2.2
Prince Edward Island.....	55	82	1.4
Nova Scotia.....	408	597	1.4
New Brunswick.....	285	540	1.8
Quebec.....	2,467	3,503	1.4
Ontario.....	915	3,638	3.9
Manitoba.....	203	800	3.9
Saskatchewan.....	149	762	5.1
Alberta.....	140	400	2.8
British Columbia.....	375	680	1.8

(Calculated on 1940 deaths.)

Up to the present time there has been a steady increase in treatment facilities, particularly in certain groups where beds were previously lacking.

In 1937, the number of Canadians of French racial origin under treatment was 2,548. In 1940 the number had risen to 3,795. The treatment of tuberculosis for the Indians has now become a reality. In 1937, only 62 Indians were listed as receiving treatment in Canadian institutions. In 1940, the number was 492, and the number now under treatment by reason of the use of departmental hospitals at Fort Qu'Appelle, Sask., Sardis, B.C., Dynevor and Fisher River, Man., Manitoulin Island and Fort William, Ont., will bring the total to at least 800 in 1942. This number should be doubled at the earliest opportunity. I would like to pay tribute to the Indian Affairs Branch for their foresight in developing this program as rapidly as possible.

The test of the adequacy of facilities is shown in the extent to which patients are admitted promptly after a diagnosis is made. If we take as an index the percentage admitted in less than a month, we see how this works out in Canada (Table IV). Ontario, Manitoba, Saskatchewan and Alberta in 1940 were able to admit from 60 to 83 per cent within a month, whereas in the other provinces less than one-half of this proportion were admitted.

TABLE IV
PERCENTAGE OF NEW PATIENTS ADMITTED WITHIN ONE MONTH OF DIAGNOSIS

<i>Province</i>	<i>1937</i>	<i>1938</i>	<i>1939</i>	<i>1940</i>
Prince Edward Island.....	26.7%	15.2%	25.0%	21.3%
Nova Scotia.....	39.9%	23.8%	30.5%	25.4%
New Brunswick.....	41.3%	23.5%	30.6%	22.8%
Quebec.....	41.5%	37.7%	36.3%	36.0%
Ontario.....	62.4%	51.9%	55.3%	60.0%
Manitoba.....	66.4%	72.1%	70.0%	67.0%
Saskatchewan.....	82.5%	63.3%	86.4%	83.2%
Alberta.....	74.4%	70.0%	48.0%	67.0%
British Columbia.....		40.0%	47.0%	47.5%

The total number of beds in operation in 1940 was 10,459 and 11,524 patients were admitted and 11,230 were discharged; 3,589,691 patient days' treatment were given at a total cost of \$6,865,963. When we consider the added cost of those not included in this survey, the cost of clinics and money spent in voluntary funds such as the Christmas Seal Sale, the total is well over \$8,000,000.

The cost of treatment has been a great bottle-neck in preventing the prompt admission to institutions of tuberculous patients. Originally the responsibility for indigents rested with the individual municipalities. During the last fifteen years there has been great progress made in solving this problem. There is a tendency for the provinces to assume more and more of

the costs of treatment. West of the Great Lakes the treatment of tuberculosis is, for practical purposes, now assumed by the state. In Saskatchewan and Alberta it is entirely so, and in Manitoba and British Columbia in 1940, the proportion of those who paid in whole or in part was around 1 per cent only. In Ontario, 10 per cent paid in full and 2.7 per cent in part. In Quebec, 4 per cent paid in full and 4 per cent in part. The Maritime Provinces are the only ones where a substantial proportion of patients pay something towards the cost of treatment. In New Brunswick in 1940, 18 per cent paid in full and 4 per cent in part. In Nova Scotia, 31 per cent paid in full and 6 per cent in part, and in Prince Edward Island, 35 per cent paid in part only. It will be noted that there is a definite relationship between the early admission of patients and the number of beds available, and whether the cost of treatment is free.

TABLE V
PERCENTAGE OF PATIENTS PAYING TREATMENT COSTS

	1938		1940	
	Full	Part	Full	Part
Canada.....	7.0%	2.5%	4.2%	3.4%
Prince Edward Island.....	6.2%	40.0%		35.0%
Nova Scotia.....	32.2%	3.2%	31.0%	6.0%
New Brunswick.....	14.3%	1.7%	18.0%	4.0%
Quebec.....	3.5%	3.3%	4.0%	4.0%
Ontario.....	1.2%	6.0%	10.0%	2.7%
Manitoba.....	1.5%		1.3%	
Saskatchewan.....				
Alberta.....				
British Columbia.....	Less than 1%			

At the present time, emphasis is being placed on retaining the open case of tuberculosis in sanatoria until it becomes sputum free or until home conditions are such that an earlier discharge is allowed. No doubt legal authority will help to retain the incorrigible patient, but we must remember that it is well to consider all the factors leading to an early discharge. Every tuberculosis patient who leaves against advice represents a weakness somewhere in our system of control. The proportion in some of the provinces who leave against advice is larger than we realize. Here is the list for the various provinces (Table VI). It is obvious that we should carefully analyse all the factors involved and seek in every way possible to remedy conditions in our institutions to offset this failure in efficient segregation.

Collapse therapy has proved a valuable adjunct to the treatment of tuberculosis and assists in no small measure in recovery of patients and making

TABLE VI
PROPORTION OF PULMONARY CASES DISCHARGED AGAINST ADVICE*

	<i>Total</i>	<i>Unimproved</i>
Canada.....	21.0	55.2
Prince Edward Island.....	5.0	20.0
Nova Scotia.....	13.0	40.0
New Brunswick.....	5.8	21.0
Quebec.....	35.6	69.6
Ontario.....	12.7	48.6
Manitoba.....	13.3	30.3
Saskatchewan.....	11.5	33.3
Alberta.....	12.4	23.0
British Columbia.....	16.0	62.2

*Percentage of total discharges and percentage of those unimproved who left against advice.

them sputum-free. A survey indicates that this has developed in a satisfactory manner in all provinces. There is not so much variation in its application as was evident in 1937. Table VII gives the extent to which collapse therapy is used, also the two well-known collapse measures—pneumothorax and thoracoplasty. Other surgical procedures vary a good deal in different institutions and from year to year, but the commoner ones give us an index as to common procedures.

TABLE VII
COLLAPSE THERAPY IN CANADIAN SANATORIA

	<i>Pulmonary cases</i>	<i>Collapse therapy</i>	<i>Pneumothorax</i>	<i>Thoracoplasty</i>	<i>Phrenic</i>
Canada.....	9,307	37.2%	18.9%	4.9%	7.0%
Prince Edward Island.....	54	42.6%	27.7%	12.9%	7.4%
Nova Scotia.....	598	47.6%	28.3%	6.5%	10.8%
New Brunswick.....	392	38.7%	21.1%	9.9%	2.0%
Quebec.....	3,174	21.9%	14.5%	3.6%	2.4%
Ontario.....	2,681	49.4%	20.9%	4.5%	12.2%
Manitoba.....	834	37.2%	23.2%	6.2%	2.1%
Saskatchewan.....	590	37.6%	16.9%	6.9%	9.4%
Alberta.....	290	32.4%	21.0%	1.3%	5.5%
British Columbia....	694	51.7%	26.2%	4.3%	9.5%

The proportion of deaths in institutions is an index of the extent to which segregation is carried out in the different provinces. This varies a good deal and again gives us a lead as to where beds are most needed. In 1940, the percentage was as follows:—

TABLE VIII
PROPORTION OF DEATHS IN INSTITUTIONS

Canada.....	33.0%
Prince Edward Island.....	34.0
Nova Scotia.....	34.0
New Brunswick.....	26.0
Quebec.....	25.8
Ontario.....	53.4
Manitoba.....	37.4
Saskatchewan.....	36.0
Alberta.....	17.0
British Columbia.....	22.0

If the Indian deaths were excluded, the proportion of patients who die in institutions in the four Western Provinces would be considerably increased.

The foregoing is an outline of armaments for the control of tuberculosis. The war has brought forcibly to our attention the fact that tuberculosis is a major public health problem and that we must use these facilities to the best advantage if we are to prevent an increase from arising during the war that will prolong for many a day the time when we can feel that the disease is even relatively under control.

In a paper on "Tuberculosis in England During the War" (2), Dr. J. B. McDougall, speaking on the increase in tuberculosis in Britain, states: "Cold, calculating figures which are presented to us from time to time from the Registrar General's Offices and Government departments tell us something of the real facts, and prove to us all that our efforts in war must be multiplied many times over if we are to prevent tuberculosis becoming the evil scourge that it can be if left even a short period without being attacked from every possible angle." His final summary applies with equal force to our own country: "All the evidence shows that we have a very long way to go before we are in a position to eradicate foci of massive infection in the homes of many thousands of people, and until public opinion enables tuberculosis workers in all parts of the world to investigate by clinical, radiological, statistical and any other means at our disposal, the nests of infection which are impeding the fall in the death rate and maintaining the morbidity rate from tuberculosis, we are never likely to obtain the results we desire and which our enthusiasm deserves."

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Diphtheria Toxoid and the Reinforcing Dose*

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THE reduction in the incidence of diphtheria in Canada since the introduction of diphtheria toxoid in 1925 is a story well known to all who have followed the advances of preventive medicine. In the year 1925, 7,383 cases of diphtheria were reported in Canada, giving a morbidity rate of 80 per 100,000 population and a mortality rate of 10.5 per 100,000. In 1929, the diphtheria morbidity rate was still 88 per 100,000 and the mortality rate, 9.8 per 100,000; but from 1929 to 1935, with the increasing use of toxoid, there was a continued lessening of the number of cases of diphtheria occurring annually in Canada. In 1935, 1,995 cases were reported, a morbidity rate of 18 per 100,000. In seven years there had been a lowering of the morbidity rate from 90 to 18 per 100,000, a reduction of 80 per cent in the annual incidence. Some local health departments, particularly those in larger centres, developed well-organized immunization programs and the use of toxoid in private practice increased. Diphtheria was rapidly becoming a disease of the past. However, between the years 1935 and 1938, an increase in the number of cases of diphtheria occurred throughout Canada. In 1936, 2,043 cases were reported, with a morbidity rate of 19 per 100,000 population. In 1937, there were 3,113 cases, a morbidity rate of 28 and in 1938, 3,601 cases, with a morbidity rate of 32 per 100,000.

Since 1938, there has been a second reduction in the number of reported cases: 2,874 cases in 1939 and 2,335 cases in 1940.

Paralleling the reduction in the number of cases, the mortality rate was lowered from 10.6 per 100,000 in 1928 to 2.1 in 1934. This was followed by a rising trend to reach 3.9 in 1938. Since then there has been a sharp reduction and the diphtheria mortality rate in Canada reported for the year 1940 was 1.8 per 100,000. This marked the lowest diphtheria mortality rate ever recorded for the Dominion.

After experiencing an 80 per cent reduction in the morbidity and mortality rates from the years 1925-35, following the introduction of the use of diphtheria toxoid in Canada, it is not easy to explain the increases in cases and deaths that occurred in the years 1936-38. Two questions arise which deserve consideration:

(1) Did a state of complacency occur and as a result immunization was neglected?

(2) Does the individual, once protected by diphtheria toxoid, lose his immunity over a period of years?

The answer to the first question may be found by studying the immuni-

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zation reports of the various communities throughout the Dominion. Every health officer in Canada knows the answer for his own community. Although certain cities and towns and some rural communities continue to carry out an effective immunization program against diphtheria, there are many localities throughout the country where immunization against diphtheria is practised rather spasmodically or not at all.

The answer to the second question is more difficult. First, consideration must be given to the choice of antigen for the initial immunization. One should have reasonable assurance that the antigen used will produce an immunity in a high percentage of individuals treated, and that the danger of abscess formation and undesirable side reactions is eliminated as far as possible.

The use of three doses of unmodified toxoid at three-week intervals has given most satisfactory and gratifying results in Canada, throughout the past ten years.

However, in a group of 200 children, initially Schick-positive and given three doses of toxoid, all showed some loss of antitoxin by the fourth year. It has also been shown that some individuals lose antitoxin more rapidly than others and since the antitoxin content of the circulating blood is one of the assessable factors in diphtheria protection, it may be determined to what extent this protection is lost over a period of years. In a study of 244 children bled at intervals after three doses of toxoid the diminution of antitoxin in the group as a whole showed a reduction in successive years of 33, 65, 75 and 78 per cent. Therefore, unless the antitoxin level is fairly high after the three doses of toxoid, there is, over a period of years, danger of the antitoxin content of the blood being lowered below the level of immunity. Of course, some individuals will develop a higher antitoxin content than others and some will lose antitoxin more rapidly than others (1).

If the positive Schick test (that is, less than 1/250 unit of antitoxin) is taken as the protective level, it can well be appreciated that an individual who has less than 1/50 unit of antitoxin after his initial immunization is in danger of becoming unprotected from loss of antitoxin in four years' time; and from studies made in this connection, we might expect 10-15 per cent of individuals to be Schick-positive four or five years after the initial immunization.

Reinforcement of antitoxic immunity is recommended in children who have had their initial immunization three to five years previously. The antitoxin response to this secondary stimulus ("dose de rappel" of Ramon) is rapid and attains a relatively high level. A study of a small group of children showed that the subcutaneous injection of 0.1 cc. of fluid toxoid was effective in raising the antitoxin content of the blood to a protective level (2).

The use of the reinforcing dose as part of a community immunization program against diphtheria was effected in London in the fall of 1941 when 2,971 school age children who were known to have had three doses of unmodified diphtheria toxoid five years or more previously, were given a single subcu-

taneous injection of 0.1 cc. of unmodified toxoid. The ages of the children ranged from 6 to 16 years.

Forty-eight hours after the subcutaneous injection of 0.1 cc. of toxoid, the children were observed for the presence of local reactions and questioned regarding the occurrence of any general reaction (fever, headache, general malaise, etc.) during the forty-eight hour period.

It was observed that 446 (15.9 per cent) children showed either a local reaction or a local reaction plus general symptoms. Two hundred and twenty-three children (50 per cent of the 446) showed only a local reaction of less than one inch of redness without swelling and without any general symptoms. Three hundred and fifty children showed only a redness about the injection site without swelling, ranging from less than one inch to three inches in diameter. Eighty-five children showed a local reaction of redness with some swelling of the arm. In 66 of these, the area of redness was less than two inches in diameter and in 30 it was less than one inch. Eleven children gave a history of having experienced some general symptoms; 6 of these showed a local reaction of less than one inch in diameter. Only 2 children showed a marked local reaction accompanied by general symptoms.

The percentage of reactors according to age ranged from 12.5 per cent for children 15-16 years of age to 19 per cent for children 10-11 years. One hundred and three children, 14.2 per cent of the children from 6-9 years, showed some reaction; and of these, 62 showed only a redness of less than one inch in diameter (table I).

TABLE I

DIPHTHERIA TOXOID—REINFORCING DOSE
REACTIONS NOTED ACCORDING TO AGE GROUPS FOLLOWING 0.1 CC. OF DIPHTHERIA FLUID
TOXOID AS A REINFORCING DOSE—FIVE YEARS OR LONGER AFTER INITIAL
THREE DOSE INOCULATION

<i>Age</i>	<i>Total inoculated</i>	<i>Redness only</i>	<i>Redness with swelling</i>	<i>Redness with systematic symptoms</i>	<i>Total</i>	<i>Per cent reactors</i>
10 years.....	725	83	18	2	103	14.2
10-11 years.....	336	53	9	2	64	19.0
11-12 years.....	511	66	18	1	85	16.6
12-13 years.....	563	79	11	4	94	16.7
13-14 years.....	412	46	15	1	62	15.0
14-15 years.....	171	18	7	1	26	15.2
15-16 years.....	64	4	4		8	12.5
16 and over.....	9	1	3		4	44.4
Totals.....	2,791	350	85	11	446	15.9

Six weeks later, Schick tests were carried out on 1,093 children who had received the reinforcing dose. The toxoid controls were read after forty-

eight hours. One hundred and forty-seven children (13.7 per cent) showed some reaction to the toxoid. Eight of these children (5.4 per cent) had a local redness of less than 5 mm., 73 (49.7 per cent) had an area of redness 5 to 9 mm. in diameter and 66 (44.9 per cent) showed a reaction of 10 mm. or more (table II).

TABLE II
SCHICK TEST REACTORS
POSITIVE CONTROLS (TOXOID) SHOWING THE SIZE OF LOCAL REACTION,
SIX WEEKS AFTER RECEIVING 0.1 cc. DIPHTHERIA FLUID
TOXOID, REINFORCING DOSE

<i>Diameter of reaction</i>	<i>Number</i>	<i>Per cent</i>
<5 mm.....	8	5.4
5-9 mm.....	73	49.7
10-14 mm.....	41	27.9
15 mm. and over.....	25	17.0
Totals.....	147	100.0

According to age groups, 7.1 per cent of the children 6-7 years were reactors while in the ages from 7-15 years, the percentage of reactors ranged from 11.1 per cent to 18.1 per cent with the highest percentage of reactors in the 14-15 year age (Table III).

TABLE III
SCHICK TEST CONTROL (TOXOID) ACCORDING TO AGE
SIX WEEKS AFTER RECEIVING 0.1 cc. DIPHTHERIA FLUID TOXOID,
REINFORCING DOSE

<i>Age</i>	<i>Positive</i>	<i>Negative</i>	<i>Per cent positive</i>
5-6 years.....		5	
6-7 years.....	3	39	7.1
7-8 years.....	10	49	17.0
8-9 years.....	7	51	12.0
9-10 years.....	13	68	16.0
10-11 years.....	13	104	11.1
11-12 years.....	32	186	14.6
12-13 years.....	32	193	14.2
13-14 years.....	21	139	13.1
14-15 years.....	14	63	18.1
15-16 years.....	2	25	7.4
16 and over.....		1	
Totals.....	147	923	13.7

The Schick tests were read on the sixth day; of the 1,093 children given the test, 1,062 showed a negative reaction, and 31 (2.83 per cent) were interpreted as Schick-positive. Any redness about the intracutaneous injection was regarded as a positive reaction.

Children showing a positive Schick test ranged from 7 to 15 years of age. The time which had elapsed between the initial three-dose inoculation and the reinforcing dose varied from five to ten years. Three children who showed a positive Schick test also showed a positive reaction to the toxoid control of 9, 12 and 18 mm. respectively.

Among the children who had received their initial immunization in 1935 and 1936 (six and five years previously), a positive Schick test was shown in 1.7 per cent and 0.9 per cent, while among those who had received their three-dose inoculation in 1931 and 1932 (ten and nine years previously) a positive Schick test was shown in 4.9 per cent and 5.1 per cent respectively (table IV).

TABLE IV
SCHICK TEST (TOXIN)
SIX WEEKS AFTER RECEIVING 0.1 CC. DIPHTHERIA FLUID TOXOID,
REINFORCING DOSE

<i>Year of initial 3 dose inoculations</i>	<i>Positive</i>	<i>Negative</i>	<i>Per cent positive</i>
1936.....	5	283	1.7
1935.....	2	214	0.9
1934.....	8	191	4.0
1933.....	2	92	2.1
1932.....	5	97	4.9
1931.....	2	37	5.1
1930.....	0	6	
No date available.....	7	142	4.7
Totals.....	31	1,062	2.83

SUMMARY

Two thousand seven hundred and ninety-one children who had been given three doses of unmodified diphtheria toxoid five years or more previously were given a subcutaneous injection of 0.1 cc. of unmodified diphtheria toxoid as a reinforcing dose.

Four hundred and forty-six or 15.9 per cent of these children showed some reaction to the reinforcing dose, the large majority showing only a local reaction. Only eleven children gave a history of any generalized symptoms, two of whom were ill enough to remain home from school.

One thousand and ninety-three children who had the reinforcing dose were Schick-tested six weeks later, and 1,062 or 97.3 per cent were found to be Schick negative and only 31 or 2.83 per cent Schick positive. The per-

centage of Schick positives among those who had had their primary inoculations nine or ten years previously was from four to five times greater than among those who had been inoculated only five or six years before.

Of the children given the Schick test 13.7 per cent showed a positive reaction to the toxoid control. Only 7 per cent of the children under 7 years of age showed any reaction to the toxoid while 14 per cent of the children from 7 to 16 years of age showed some reaction.

CONCLUSIONS

1. The annual incidence of diphtheria and diphtheria deaths in Canada have been reduced more than 80 per cent since the introduction of toxoid.

2. The reinforcing dose is important in maintaining a satisfactory state of immunity.

3. The reinforcing dose may be included as a public health measure in an effective community immunization program against diphtheria.

4. A safe and satisfactory reinforcing antigenic stimulus for children who have received three doses of unmodified diphtheria toxoid as their initial immunization, appears to be 0.1 cc. of unmodified toxoid.

5. Children given three doses of unmodified diphtheria toxoid plus a reinforcing dose of 0.1 cc. of the same antigen five years later, in a community that has been essentially free from diphtheria for the past 9-10 years—in London, a community of 78,000 population, 25 cases of diphtheria had been reported for the years 1933 to 1941 inclusive—may be expected to be Schick negative in approximately 97 per cent of the cases.

6. Continuous and effective immunization is essential for the prevention of diphtheria and diphtheria deaths in a community.

Grateful acknowledgment is made of the generous assistance and co-operation given by Dr. D. T. Fraser and the Connaught Laboratories in connection with this study.

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An Outbreak of Acute Anterior Poliomyelitis in the Okanagan Valley, British Columbia

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Kelowna, B.C.

DURING the summer of 1941 a total of 55 cases of infantile paralysis were reported in the Province of British Columbia. These cases were distributed over the main routes of travel, with the greatest concentration of cases occurring in the Okanagan Valley, where the disease broke out at three separate points.

The Okanagan Valley runs almost due north and south between low-lying mountains for approximately 175 miles from the international border north to Sicamous, a village at the entrance of Mara Lake into Shuswap Lake on the main line of the Canadian Pacific Railway. The Valley is quite narrow, and at its widest point extends only a few miles east and west. Numerous lakes are found in the district, the largest of which is Okanagan Lake. The small towns of Enderby and Armstrong are approximately 25 and 40 miles respectively south of Sicamous, and Mabel Lake lies 25 miles east of Enderby. About 14 miles south of Armstrong is the City of Vernon, a short distance from the northern end of Okanagan Lake, and Kelowna is situated about 35 miles south of Vernon at about the midpoint of the eastern shore of Okanagan Lake.

Summers in the Okanagan Valley are hot, and especially during the months of July and August temperatures recorded in the shade not infrequently register well over the 100-degree mark. The winters are moderate, and the climate is a relatively dry one. Irrigation is carried out in the district including and south of Vernon where fruit-growing is the chief industry, while mixed farming is carried on in the neighbourhood of Armstrong north of Vernon. The whole district tributary to the Okanagan Valley has a population of approximately 51,000, the chief centres being Vernon, Kelowna, and Penticton (at the foot of Okanagan Lake), each with a population of between 5,000 and 6,000.

The first cases were reported from the Armstrong district, and at the request of the Provincial Board of Health an investigation was carried out in regard to the epidemiological features of these and all subsequent cases occurring in the Valley.

HISTORIES AND EPIDEMIOLOGICAL FEATURES OF ARMSTRONG CASES

Case 1: J. B., female, age 7

First seen by a physician July 28th for treatment of a bee sting on the left instep. On examination the child was found to be slightly feverish and complained of an ache extending up the leg into the thigh. On July 30th the child was up and about, and while she was standing still her leg gave way and she fell

to the floor. The physician was again called, and on examination found definite weakness of the muscles of both legs. Examination of the spinal fluid showed a white cell count of 1,000. Subsequent clinical findings were stiffness of the neck and extensive paralysis of the lower limbs. After three months this child had regained only slight power of movement in the affected limbs, and at present is a patient at the Queen Alexandra Solarium at Mill Bay.

Case 2: Mrs. A. H., age 23

Became ill at Mabel Lake, the local summer resort for the Armstrong-Enderby district, on August 6th. The patient complained of headache, nausea and aching eyes. As she was pregnant at the time and already under her physician's care, she was ordered into hospital for observation. On examination, stiffness of the spine was noted and there was in addition paralysis of the urinary bladder. A lumbar puncture was carried out on August 8th, and the spinal fluid showed a cell count of 200. Sixty cc. of serum separated from blood obtained from a local donor were administered intramuscularly. On August 9th the patient was sent home under the care of a nurse. Re-examination on August 10th revealed some weakness of the left deltoid, and this weakness is still present after ten months.

Case 3: L. B., male, age 11, of Armstrong

Became ill with a gastro-intestinal disturbance following return from a week's visit to Mabel Lake, on August 10th. The patient was feverish, and stiffness of the neck was noted on examination. The spinal fluid count was 100, and acute anterior poliomyelitis was suspected. A small amount of whole blood was administered intramuscularly. There was no paralysis and the child recovered quickly.

Case 4: N. M., male, age 12, of Armstrong

This boy was taken to the family physician on August 14th from a Scout camp at Mara Lake. He complained of headache, nausea and loss of appetite. His temperature was 101-2°F., and stiffness of the neck and back was present on examination. On August 15th the boy still complained of headache, and his reflexes were found to be weak and the Kernig sign was positive. On August 16th both legs were found to be paralyzed, and there was weakness of the shoulder muscles and paralysis of the urinary bladder. No examination of the spinal fluid was made, and serum was not administered. After ten months this case still shows fairly widespread paralysis. The child is able to walk, but the muscles of the legs are weak and show considerable wasting.

Case 5: J. M. age 14, male, of Armstrong rural district

First seen by the physician August 16th on his return from the Mara Lake Scout camp where he had been ill since August 11th. He complained of nausea and persistent vomiting with slight headache, and had a temperature of 100°F. The night of the 16th the boy passed restlessly, complaining of muscle aches and pains. The following day respiration became rapid, the temperature rose to 102, dysphagia and dysarthria were present, the speaking voice became a whisper, and towards evening the patient was unable to cough and had great difficulty in

clearing his throat. At noon on August 18th the temperature returned to normal; breathing, however, had become more rapid and shallow, and respiratory failure was considered probable. At 3.00 p.m. difficulty in respiration suddenly became acute, and the patient died before the arrival of the attending physician.

Case 6: Phyllis H., female, age 7, of Armstrong

Became ill August 17th suffering from headache, nausea and vomiting, and the family physician was called on August 18th. Dysphagia and dysarthria were marked. The patient's condition remained critical for some time, and it became necessary for some days to feed her by stomach tube. This child appears to have made a complete recovery, with the possible exception that her voice is said to have a higher pitch.

Case 7: F. B., male, age 2, of Armstrong

On September 7th, one week after returning from a visit to the country, it was noticed by the parents that the child had suddenly commenced to limp and was having more falls than usual in playing about the house. Otherwise the child seemed to be normal. The following day he was taken to the family physician, who found marked paralysis of the muscles of the right ankle and foot. Paralysis of the bladder also was present for several days. Three months later little recovery had taken place in the affected ankle, but recovery seems to be complete at the end of ten months.

J. B. (Case 1) had spent the month immediately preceding her illness in Armstrong, with the exception of a visit to the Kalamalka (Long Lake) beach near Vernon, on July 6th. Her brother R. B., was a frequent visitor to this crowded beach throughout the month of July. The source of this child's infection, however, was not determined.

Cases 2 and 3 occurred in Armstrong residents visiting at Mabel Lake, living in cottages separated from each other by only a short distance. Case 2, Mrs. H., suffered from a bee sting a few days before her illness. She visited at the lake from July 26th to August 6th, and Case 3 was there from August 2nd to August 10th. The water used at the camp was from a well which served as a community supply and both families used canned milk; other sanitary facilities were of the type usually found at camps. Both cases ran a mild clinical course resulting in complete recovery. It was also learned that a sister of Case 1 had spent an evening at the home of Case 2 shortly before the latter went to Mabel Lake. Apart from this possibility, no explanation for the infection of Case 2 was found.

Cases 4 and 5 were boys attending the Scout camp held at Mara Lake approximately mid-way between Armstrong and Sicamous. Case 6 was a sister of one of the boys attending this camp.

The Scout camp was held on public camping grounds from August 6th to 15th. One of the boys, who had been swimming at Kalamalka Lake July 27th, was slightly ill in an indefinite manner August 5th but was well enough to go to camp with the rest of the boys on the following day. Four tents were put up for the camp—one for headquarters, and one for each of the Beaver, the Seagull and the Lynx Patrols. Each patrol took its turn at kitchen fatigue, assisting in

preparing the food and looking after the kitchen. The food was served from the kitchen and each boy washed his own dishes and kept them in racks outside his own tent when not in use. Each patrol had a separate table but the food and supplies were common to all. Canned milk only was used, and water for the camp was obtained from a spring which served as a common supply for all campers. All illness among the scouts occurred in occupants of the Lynx tent. Seven of the eight boys in this tent had a history of illness in some form with the onset occurring within a twenty-four hour period in all cases. The outbreak was very suggestive of food poisoning. So far as we have been able to learn, the only article of food eaten by the Lynx patrol and not shared in by the other boys was an iced cake which was sent to the boys by the mother of Case 4 on visitors' day, Sunday, August 10th. The cake was eaten by the boys early Monday morning before breakfast. Monday evening, August 11th, A. P. was acutely ill and vomited several times both before and after he went to bed. J. M. (Case 5) and J. R. were also ill at this time. These three boys felt so ill that they returned from a corn roast without eating any corn and went to bed. Tuesday afternoon, August 12th, N. M. (Case 4) was indisposed, complaining of headache. The following day he was still ill and was taken home on the Thursday. Tuesday evening, the 12th, P. H. (brother of Case 6) was acutely and actively ill. A brother of P. H. complained of headache Tuesday, Wednesday and Thursday. K. M. was ill Wednesday and Thursday, and one of the two remaining boys in the tent states that he was slightly indisposed on Tuesday but not seriously or acutely ill. Wednesday, August 13th, the boys of the Lynx tent of their own accord cleaned out the tent and scattered fresh sand on the floor. In spite of this, none of the boys would sleep in this tent, so impressed were they with all the illness which had occurred. Tuesday afternoon, August 12th, J. M. (Case 5) claimed to be sufficiently well to go on an overnight trip by boat to Sicamous. He returned to camp the following day considerably fatigued after having helped row the boat a total of fourteen miles. On August 14th, while still feeling poorly it is thought that he more or less forced himself to enter swimming competitions at the camp. Camp was broken up the following day, and the boy was placed under the care of the family physician on Saturday, August 16th.

On Thursday, August 14th, N. M. (Case 4) was sent home in a visitor's car. Among others in this car was Mr. H., father of Case 6, who sat in the back of the car with N. M. and with the boy's blankets and equipment. Mr. H., however, has stated that as far as he knows he did not have any close contact with his daughter Phyllis (Case 6) Thursday evening on his return home. On the other hand, this girl's brother, P. H., who had been quite ill Tuesday evening, returned home August 15th, the morning after his father was in contact with Case 4, and brought blankets and equipment with him. Phyllis H. first became ill on Sunday, August 17th.

No sickness of any kind occurred in any of the other patrol tents during the period of the camp, in spite of frequent and fairly intimate mixing of the groups in various activities.

Case 7, F. B., the child who was observed to be ill on September 7th, lives a short distance from the family D., and was a frequent visitor at the D. home.

It was learned in addition that the F. B. family obtained their milk during the first week of September from the D.'s, who kept one cow. It was also learned that G. D. was at the Scout camp at Mara Lake and therefore must be considered as a contact of the cases which occurred there, and this same boy, G. D., was indisposed, complaining of nausea and headache on August 25th, some days before F. B. returned home.

THE SICAMOUS CASES

Case 1: F. S., male, age 42, logger

Was admitted to the Salmon Arm hospital August 10th as an accident case. The patient reported that while loading lumber his left leg became caught between boards and in extricating it he wrenched his back. The attending physician reported that on examination of the patient there was tenderness and rigidity in the left lumbar region. Symptomatic treatment was carried out. The third day following admission to hospital the patient became feverish, and on the fourth morning complained of inability to walk. On examination, it was found that both legs were paralyzed. A spinal puncture was made, the fluid showing a cell count of 120 and some increase in globulin. A diagnosis of acute anterior poliomyelitis was made. This case is still in hospital in Victoria, but is understood to be making some progress towards recovery (July 1942).

Case 2: Mrs. F., age 22, mother of two children

The patient was taken from Sicamous to the Salmon Arm hospital on August 27th, complaining of severe pain in the sacrum. On examination the patient was found to have some fever, and there was rigidity of the neck and spine. A lumbar puncture was carried out, showing a cell count of 100 with increased globulin. Reflexes were found to be slightly exaggerated. A diagnosis of acute poliomyelitis was made. The patient made an uneventful recovery.

On learning of these cases it was at first thought that there might be some connection between the Armstrong scouts and the Sicamous outbreak, since it was known that a group of scouts including Case 5 of the Armstrong group had made an overnight trip from their camp at Mara Lake to Sicamous on August 12th-13th. On investigation, however, it was learned that the first Sicamous case was already in hospital in Salmon Arm at the time of the Scout trip.

Both cases came from what is known as the old townsite of Sicamous. Case 1 lives on the lake shore about two miles from Sicamous. Mrs. F. lives along a road running through the bush from the lake to the main highway. Her home is situated about a mile and a half from Case 1, and there was only one other family in the vicinity. In spite of the apparent isolation of these families, it was learned that in both instances there had been contact of comparatively recent date with the district around Armstrong. Case 1 had visited friends at Enderby one week before he became ill. There was a child in this Enderby household, but nothing further could be learned as the family had left the district by the time the investigation was made. Case 2 also had a contact with Enderby. About August 10th a married sister from Enderby took her small boy to visit at the home of Case 2. The boy was ill when he arrived or became ill shortly after

arrival, and was taken home after a stay of two or three days. About a week later the small son of Case 2 became acutely ill with all the signs of a fairly severe gastro-intestinal upset. This child was ill for about four days, and before he recovered his sister became sick with the same type of disturbance. Two days later both Case 2 and her husband were definitely indisposed, although they were not as violently ill as the children. Mrs. F., however, suffered so much from pain that she went to the hospital at Salmon Arm. At the same time as the F. children were ill, children in the neighbouring family also suffered from similar gastro-intestinal disturbances.

Early in September two cases of anterior poliomyelitis were diagnosed almost simultaneously in the Kelowna rural district, in the area served by the Okanagan Valley Health Unit, fifty miles south of Armstrong. Histories are as follows:

Case 1: B. B., male, age 9, Okanagan Mission

First became ill while at school on the morning of September 9th, with a gastro-intestinal disturbance. At noon it was observed that he did not eat well and appeared to have difficulty in swallowing. He was sent home from school, and the family physician was called in that evening. The child complained of difficulty in swallowing, headache, and very marked constipation. Physical examination showed stiffness of the back and difficulty in speaking, and examination of the spinal fluid showed a cell count of 25 with increased globulin. He appears to have made a complete recovery.

Case 2: L. C., female, age 5, Rutland

This child first became ill on Sunday, September 7th, complaining of constipation, nausea, and headache. She spent that and the following day in bed. On Tuesday, September 9th, she was up and about again and states that in the morning she went down to the basement and hurt her right leg against a box. Later that day it was observed that she was dragging her right leg, and the parents attributed this lameness to the morning injury. However, as the child did not improve and complained of aching in the muscles of both legs, she was placed under a physician's care on September 12th. Physical examination failed to disclose any sign of injury to account for the lameness, and it was observed that the child was dragging the leg rather than limping. A spinal puncture was not made. This child nine months later is still under treatment at the Crippled Children's Hospital in Vancouver.

On September 2nd, the public health nurse in this district had visited a family named W. at Okanagan Mission, and found a young boy recovering from an illness which he had had since August 23rd. During this time it appears that he had complained of nausea, loss of appetite, and sore and aching legs. For several days he had refused to get out of bed or was unable to do so. The public health nurse as a result of her investigation suspected that the child might have poliomyelitis, and insisted that he be taken to the family physician who, however, made a diagnosis other than poliomyelitis. It was also learned that the sister of this child, M. W., had been visiting with friends in the Armstrong district from the first of August until August 18th, when her parents

were asked to take her home because of the seriousness of the poliomyelitis situation in that district. This girl, her brother and her sister attended school at Okanagan Mission when classes were resumed on September 2nd, the boy being a classmate of B. B. (Case 1). During the early part of the week of September 7th twelve children in this school, in addition to B. B., were ill with gastro-intestinal disturbances. On further investigation it was learned that L. C. (Case 2) of Rutland is a cousin of M. W. and had visited at the W. home at Okanagan Mission on September 2nd and 6th, on both occasions eating with the W. family.

DISCUSSION

Early in the investigation our attention was drawn to a consideration of bathing beaches as a possible source of infection because of the relatively numerous rumors associating a variety of post-bathing infections with the crowded beach at Kalamalka Lake near Vernon, fourteen miles to the south of Armstrong.

J. B. (Case 1) with her family was at the Kalamalka Beach July 6th and her brother, a boy of about sixteen, swam there at least once a week all through July. In addition, five boys who later attended the Scout camp at Mara Lake had been swimming at this beach as late as July 27th. This group included two boys from the Lynx tent, one of whom was G. M., the lad who was ill the day before the Scout camp opened.

Suspicion was diverted from Kalamalka beach because of the reported absence of poliomyelitis cases in the Vernon district. It has since been learned, however, that several individuals, in whom poliomyelitis was suspected, were under observation in Vernon at this time. One of these cases, R. S., a resident of the unorganized territory along the Vernon-Kamloops highway, became ill July 18th. According to the mother, the child was feverish and had commenced to limp and used one arm in a manner peculiar to the child. It is understood that this child was taken to the Vernon hospital where she remained some three weeks and spent a further ten days in bed on her return home. At the present time, however, there is said to be no evidence of paralysis in this child. In view of the fact that this and other suspected poliomyelitis cases were under observation in the Vernon district, it is not impossible, and perhaps not improbable, that these or other such cases or carriers frequented the Kalamalka bathing beach and so infected other bathers, including one or more of the Armstrong boys who frequented this beach. The only connection between Case 1 and Case 2 was the finding that the sister of Case 1 spent the evening at the home of Case 2 just before the latter went to Mabel Lake. Whether this should be considered as anything more than coincidence is difficult to say. In view of the nearness of the cottages and the existing sanitary conditions at Mabel Lake it is not improbable that Case 3 derived from Case 2.

The source of infection in the scout camp at Mara Lake again is not clear. The association of certain of the boys with the Kalamalka swimming beach has already been mentioned. The outbreak on the other hand resembled very much one of food poisoning, but in view of the fact that two of the boys went on to develop definite cases of poliomyelitis it is more reasonable to suppose that all

the boys in the Lynx tent were infected at one time with this virus. In view of the circumstances, some article of food or drink appears to be the most reasonable source of infection. However, so far as we were able to learn the only article of this kind eaten by the boys in this tent not common to the other tents was the iced cake which the boys ate on the morning of August 11th.

If we assume that all the boys in the Lynx tent actually were infected with poliomyelitis virus, then we can assume that Case 6 was infected either indirectly through her father's contact with Case 4 or directly through contact with her brother P. H., who was one of the boys acutely ill in the Lynx tent. To us, the latter method seems more probable.

It is known following the closing of the Scout camp that several cases of acute and suspicious illness occurred in boys who had belonged to one or other of the patrols making up the camp. One of these lads was G. D., the neighbour of Case 7, and it is possible that he served as a source of infection for this child either by direct contact or through infection of milk sold to the family of Case 7. This milk was handled under very unsanitary conditions.

In view of the prevalence of poliomyelitis in the Armstrong district, it is not improbable that there were numerous carriers and abortive cases in the surrounding district, including Enderby. The increased reporting of gastrointestinal disturbances in the latter district to some extent bears out this assumption. It therefore may be considered not unreasonable to suppose that the Enderby district was actually the source of infection for the two Sicamous cases. Similarly, in view of the suspicious illness of the W. child in the Kelowna rural district and the contact through his sister with the Armstrong district, it would not appear to be unreasonable to attribute the cases in the Kelowna district, the relative of the W. family and the classmate of the W. boy, to the contact of the W. girl with the Armstrong district.

CONTROL METHODS

In view of the increasing incidence of poliomyelitis during the early summer in the prairie provinces, the Provincial Board of Health in British Columbia prepared circulars stressing the importance of early diagnosis, and outlining diagnostic points and methods of prevention and control. These circulars were sent to all physicians practising in the province, and undoubtedly were of considerable assistance in putting the medical profession of this province "on guard".

Attempts to control the spread of this disease, after it had broken out in the district, depended almost entirely on rigorous control of sanitation and the institution of quarantine for a period of six weeks for all cases and known contacts.

Strict supervision was maintained over the disposal of all body discharges from diagnosed cases and quarantined contacts alike. For every diagnosed case, however, there would appear to be at least several and perhaps many abortive-case carriers, and it is not unlikely that these, rather than the actual clinical cases, are responsible for the wide dissemination of the infection. Our chief concern, therefore, was considered to be the carrier problem. Furthermore a survey of the literature dealing with the more recent investigations into acute anterior poliomyelitis indicates that the discharges from both the nasopharynx and the

intestinal tract are involved as a source of virus, and it is not improbable that in this respect the latter may be the more important. Under such circumstances, it seemed only correct, faced as we were with an outbreak of acute anterior poliomyelitis, to consider this disease primarily as a disease of the gastrointestinal tract, and from a practical point of view to place it in the same class as typhoid fever and other diseases of the enteric group.

The menace of the abortive-case carrier accordingly was particularly stressed, and the public was advised through the press and over the radio regarding preventive measures. All members of the Health Unit staff in both rural and urban districts concentrated on this problem, with particular importance being given to home-visiting and inspection of environmental sanitation. Residents of the whole district were advised to boil all water intended for drinking, regardless of whether or not it had been treated previously with chlorine (as in Kelowna), and to use only pasteurized milk. The fly nuisance was stressed, as was the protection of food from contamination of all kinds. Sanitation of the home environment and of the community was emphasized, and in rural districts privies were inspected, condemned, remodelled or rebuilt as conditions required. Since the Armstrong district was outside the area served by the Okanagan Valley Health Unit, a local police officer was appointed as a special sanitary and quarantine officer. When schools re-opened early in September, older children were given instructions regarding fly-proofing of privies and the protection of food and drink, and were sent home to see that all precautions were being taken in their own homes against spread of the disease.

Clinical cases and close contacts and members of their families, with the exception of the bread-winner, were quarantined for a period of six weeks. Such measures will no doubt be considered by some as unusually severe and unnecessary. However, reports of recent laboratory work indicated that some cases at least may continue to excrete the virus of poliomyelitis for as long as three or four months. While such cases may be exceptional, it does not seem improbable that the average case, both clinical and abortive, may be infectious for periods much longer than those previously thought probable. We therefore could see no reason for releasing our poliomyelitis cases and contacts at the end of the two- or three-week period generally accepted as a quarantine period, and such is the dread of this disease in the public mind that we had no difficulty in restraining the activities of these persons for the desired length of time.

Experience had proven time and again that half-measures are useless in attempting to control the spread of acute anterior poliomyelitis. Obviously one cannot say with any degree of assurance that the strict measures taken in this district were responsible for the breaking-off of the epidemic at a time when further cases might have been expected, but we at least had the satisfaction of knowing that we were "doing something" in a district that had suffered heavily in previous outbreaks, that the epidemic was relatively short-lived, and that the sanitation of both rural and urban districts was improved in a most surprising manner. If this district is again menaced by this disease, until additional knowledge justifies a change in method it is our intention to adopt the control methods used in the 1941 outbreak.

Reclamation of Agar

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MOST of the agar now used comes from Japan, China and Ceylon. The finest and most useful for bacteriological purposes has been produced mainly in Japan. In view of a possible shortage, experiments were initiated in order to find a method for the recovery of agar from used media. The experiments have been successful and reclaimed material has now been in use for a period of over six months with completely satisfactory results.

An abstract giving details of one method was published in the Canadian Public Health Journal, January 1942. This method had certain disadvantages, the most serious being the use of acetone as a precipitating agent. Acting on a suggestion made by Dr. H. G. Dunham of the Difco Laboratories, to whom we are extremely grateful, the use of acetone was abandoned and replaced by freezing and thawing.

The method now in use consists of five steps, as follows:

- (1) Removal of heat-coagulable materials such as blood or serum.
- (2) Washing in water in order to remove water-soluble materials such as broth.
- (3) Purification by treatment with carbon black.
- (4) Concentration by means of freezing and thawing.
- (5) Drying.

METHOD

Agar which has been used for the growth of organisms in Roux bottles is autoclaved and while still melted is poured into 2-litre glass cylinders about 5" in diameter in which it is allowed to set. If the medium is in petri dishes, the agar is stripped with a spatula and thrown into boiling water in a double boiler, or in the case of heavily infected medium, the lower part of the dish is placed into the water and the agar melted off. Excessive heating is to be avoided as much as possible in order to avoid hydrolysing the agar. If blood or serum be present this is coagulated by the heat and is removed by straining through cheesecloth.

If the agar is present in weaker concentrations than 2.5-3 per cent, it is necessary to carry out a preliminary concentration. This is most conveniently done with large amounts, for which reason it is advisable to collect 15-20 litres of agar from which the heat-coagulable material has been removed. This is poured into flasks and autoclaved so that it may be stored without becoming contaminated. When the above quantity has been collected, it is melted in the steamer, mixed, and frozen in one block. The solid block is then placed in cheesecloth in a large strainer and left at room temperature. After the block has stood for three to four hours it can be broken up easily with an ice pick. It is then

left for two days, at the end of which time the ice crystals will have melted. About 60 per cent of the water-soluble constituents will have drained off in this time, leaving a thick gel in the cheesecloth containing about 4 per cent agar. This gel is then melted in a double boiler and poured into the 5" cylinders as before.

After the agar has set, it is removed from the cylinder and cut into slices 0.5 cm. or less in thickness. These are placed in 10-litre glass vessels in which they are washed with cold tap water to remove broth and other water-soluble material. This requires two days with about six changes of water. The water is changed by means of a syphon.

The water is finally drained from the agar slices in a cheesecloth-lined funnel, the agar melted in a double boiler and enough tap water added to reduce the agar concentration to about 1.5 per cent. If this is not done, the agar solution is too concentrated to be conveniently filtered.

To the hot solution, carbon black is added in the proportion of three teaspoonfuls per litre. This is heated for half an hour and filtered through a good mat of hot paper pulp (macerated Seitz films) with a sheet of filter paper above and below. Jacketed buchner funnels are a great convenience for this purpose but it can be done in an ordinary buchner if the funnel is heated in boiling water, packed with hot paper pulp, and kept covered to diminish cooling.

The resulting solution is clear and no more coloured than an aqueous solution of the ordinary commercial agar.

When 15-20 litres of the agar, purified in this way, have been collected, it is melted, and frozen in the same way as described above. It is then allowed to stand at room temperature as before, until the ice has melted and drained off. This time the gel left in the cheesecloth is spread in the form of shreds made by squeezing it through the fingers, on to several thicknesses of large filter papers.

An electric fan is allowed to play over the agar, and if it is turned over occasionally with a spatula it will be quite dry in two days. Oven drying was found to be less satisfactory.

Up to 90 per cent of the agar has been reclaimed by this process and except for a slight decrease in the rate of solubility it is as satisfactory as the commercial agar.

Recovery from Potassium Tellurite Agar or MacConkey's Agar has not been attempted but it is probable that agar from these media could also be reclaimed.

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VITAL CONTRIBUTIONS IN THE TRAINING OF PUBLIC HEALTH PERSONNEL IN CANADA

DURING the past twenty years the International Health Division of The Rockefeller Foundation, truly international in its conception and operation, has established schools of hygiene in eight countries, including Canada. To make possible the attendance of suitably qualified, professionally trained workers, fellowships in public health have been generously provided. The extent of this great contribution to the advancement of public health can be expressed in terms of the number of essential personnel trained for health departments and in terms of the expenditures that have been made, but the far-reaching influence of the contribution cannot be measured. Physicians, nurses, dentists, public health engineers, and others essential to the forwarding of public health have been trained and assisted to make vital contributions. The value of the full-time county health unit in meeting the problem of adequate local health services was early demonstrated by the International Health Division through assisting in the organization of full-time health units in the southern United States. This contribution of The Rockefeller Foundation has advanced the movement for the improvement of rural health services in many lands. In 1925 the Foundation made possible the establishing in Canada of a school of hygiene similar to the schools which had been established at Harvard and Johns Hopkins universities. Since 1938 The Rockefeller Foundation has awarded fellowships in public health to physicians and nurses in Canada, on the recommendation of the Provincial Medical Officers of Health. During the past fourteen years one hundred and five fellowships have been granted to physicians for study at the School of Hygiene, University of Toronto. Generous assistance was also given in the establishing of the School of Nursing in the University of Toronto in 1933.

To further the training of public health personnel in Canada, particularly of physicians, the Connaught Laboratories, University of Toronto, similarly provides fellowships in public health. To date forty-nine fellowships have been awarded to physicians named by Provincial Departments of Health and on terms comparable to those pertaining to the fellowships awarded by the Foundation.

To assist in meeting the emergency created by the war in the demand for trained public health personnel, the W. K. Kellogg Foundation is making grants

to the School of Hygiene and the School of Nursing, University of Toronto, to provide scholarships for exceptional students who otherwise would not be able to enter the field of public health. The Kellogg Foundation was organized in 1930 under a charter which provides for "the formulation of a comprehensive and well-organized undertaking to improve the health, happiness, and well-being of mankind, especially children", and under the leadership of its first President and General Director, the late Dr. Stuart Pritchard, broad programs were developed. The Foundation is making available to almost one hundred and fifty schools of public health, medicine, nursing, and dentistry in the United States and Canada, substantial sums which are in the nature of gifts. The funds may be used for loans to students, thus constituting a continuing fund, or for scholarships. The only restriction specified is that the scholarships for students in public health shall not amount to more than eight hundred dollars for any student in any one year. Assistance is also being provided for undergraduate students in medicine, and grants have already been made to several of the Faculties of Medicine in our Canadian universities. This action of the Kellogg Foundation in generously extending its benefactions to Canadian universities will be received with great appreciation by those who are concerned with the urgent needs which face us in Canada, and particularly by our public health leaders.

When the story of the progress of public health in Canada in the past decade is written, the benefactions of The Rockefeller Foundation, the participation of the Connaught Laboratories, and the assistance of the W. K. Kellogg Foundation in making possible the training of public health personnel in Canada will form an important part.

THE HEALTH OF SECONDARY SCHOOL PUPILS

MUCH more attention lately has been focused on the health of the pupils in our secondary schools. The importance of the development of adequate programs of health supervision for secondary-school pupils was the subject of a resolution adopted at the last annual meeting of the Canadian Public Health Association and the needs of the war are directing attention to this urgent problem. The discussion of the subject in this issue, by Dr. L. A. Pequegnat, Deputy Medical Officer of Health of Toronto, is most timely.

Only a few months ago the Minister of Health for Ontario very wisely asked all municipalities to consider this matter seriously. In most municipalities where health work is properly supervised, the primary school program is quite good, but few municipalities have as yet assumed their responsibilities in regard to an efficient secondary school health program. It may well be asked of what use it is to spend a great deal of money on a pupil's education only to find after he leaves the secondary school that he is not healthy enough to enjoy the privileges that his education should give him. Health in its broadest sense means a well-developed body, a healthy mind, and a proper outlook on life. It involves a responsibility in regard to our own health and that of others. If on graduation from the secondary school we were able to send the pupils out into the world prepared in this manner not only their own health but the mental and physical health of the next generation would be assured.

THE ASSOCIATION'S WORK DURING 1941-42

(Part III)

REPORT OF THE COMMITTEE ON HONORARY LIFE MEMBERSHIP

THE Committee on Honorary Life Membership has the honour to present as recipients, the names of two Canadian leaders in public health, George Dana Porter, M.B., Toronto, and William Warwick, M.D., D.P.H., Fredericton.

In the planning of the Ministry of Health for New Brunswick in 1918 and in the development of the public health program in that province, Dr. William Warwick rendered invaluable service, assisting the Honourable William F. Roberts, Minister of Health, and Dr. George Melvin, Chief Medical Officer. Dr. Warwick joined the Department in 1920 after extensive public health experience in federal health work and service in France in the war of 1914-18. He was one of the first district officers in New Brunswick and his efforts assured the success of the plan of providing health services through district organizations. On the retirement of Dr. Melvin in 1932



WILLIAM WARWICK, M.D., D.P.H.

Dr. Warwick became Chief Medical Officer for the Province. Under his leadership increased support was obtained for the Department, permitting of the subdivision of the Province into ten health districts, each under the direction of a full-time medical officer. Medical inspection of schools was provided and the efforts for the control of tuberculosis were greatly strengthened by the provision of additional hospitals and by the appointment of physicians with special training in tuberculosis as district health officers. Dr. Warwick served also as Registrar General of Vital Statistics and took a keen interest in establishing a high standard in vital statistics in New Brunswick.

In 1933 he served as President of the Canadian Public Health Association. The title of his presidential address, "Public Health Accomplishments in the Light of Possible Achievement", delivered in Saint John on the occasion of the Association's twenty-second annual meeting, gave ample evidence of his critical judgment and of his modesty in evaluating public health progress. The substantial progress made in New Brunswick during the twenty years of his service was based on the soundness of his judgment and his determination to provide for the humblest citizen his public health rights.

Owing to ill health, it was necessary for him to relinquish the direction of the Department in May 1940. It is pleasing that he is residing in Fredericton, where his wealth of knowledge of public health administration is still available to the Department.



GEORGE DANA PORTER, M.B.

In 1908 Dr. George Dana Porter left the practice which he had established in Toronto to devote himself to the movement for the control of tuberculosis in Canada. Five years earlier the Rev. William Moore, D.D., had laid the foundations of the Canadian Anti-Tuberculosis Association in Prince Edward Island. The resources were small and the need was great. In the twelve years during which Dr. Porter served, he became known from coast to coast as the leader of the anti-tuberculosis movement, encouraging and inspiring laymen everywhere to organize local anti-tuberculosis societies and to provide sanatorium accommodation for needy patients. In 1921 he was invited to become the first director of the Student Health Service in the University of Toronto, continuing in this office until his retirement in 1941. During the first war he was Officer Commanding, Divisional Laboratory, District No. 2.

It is particularly fitting that the Canadian Public Health Association should honour Dr. Porter. He was one of the charter members of the Association and became its first honorary treasurer, serving from 1910 to 1914. It was through his interest and financial participation that this Association now owns the Canadian Public Health Journal, for during the early years when it was published as "The Public Health Journal" Dr. Porter assisted generously in its maintenance. In 1925 he was elected President, assuming this duty at the next annual meeting in Montreal, and had the honour of serving as President for three terms. This in itself was an expression of his colleagues' appreciation of his interest and devotion to the Canadian Public Health Association. Dr. Porter has at all times been guide, counsellor and friend to the Association and its members.

J. T. PHAIR, *Secretary, Executive Committee.*

REPORT OF THE COMMITTEE ON ARCHIVES

THE Committee on Archives reports with deep regret the death of the following members during the period from June 1, 1941 to April 30, 1942:

- Dr. T. W. ALLISON, Medical Officer of Health, Caledon East, Ontario.
- Dr. E. A. BARETTE, District Inspector of Health, Ministry of Health, Quebec.
- Dr. C. F. BENSON, Medical Officer of Health, McCreary, Manitoba.
- Dr. J. B. BUELL, Medical Officer of Health, Stevensville, Ontario.
- Dr. JEAN P. DECARIE, formerly Inspector General of the Ministry of Health, Quebec.
- Mr. F. W. DUNNE, Assistant Chief Clerk, Section of Vital Statistics, Department of Public Health, Halifax, Nova Scotia.
- Dr. L. A. DUPONT, Medical Officer of Health, Kapuskasing, Ontario.
- Dr. ROBERT D. FERGUSON, Medical Officer of Health, Pilot Mound, Manitoba.

- Dr. L. O. FULLER, Medical Officer of Health, Shelburne, Nova Scotia.
Dr. HERBERT ANDREW GORDON, Medical Officer of Health, Portage la Prairie, Manitoba.
Dr. W. J. HARRINGTON, Medical Officer of Health, Dauphin, Manitoba.
Dr. R. E. HARTRY, Medical Officer of Health, Fort Frances, Ontario.
Dr. T. R. JOHNSON, Medical Officer of Health, Municipality of Colchester, Great Village, Nova Scotia.
Dr. J. JOHNSTON, Medical Officer of Health, Burgessville, Ontario.
Dr. J. N. LANGLOIS, Medical Officer of Health, Blind River, Ontario.
Dr. ALPHONSE LESSARD, formerly Director of the Provincial Bureau of Health, Quebec.
Dr. W. STUART LOGGIE, Medical Officer of Health for Northumberland County, New Brunswick.
Dr. L. J. LOUGHLIN, Medical Officer of Health, Carberry, Manitoba.
Dr. A. S. McCAIG, Medical Officer of Health, Sault Ste. Marie, Ontario.
Dr. J. D. MACDONALD, Medical Officer of Health, Huntsville, Ontario.
Dr. J. K. MACLEOD, Medical Officer of Health, Sydney, Nova Scotia.
Dr. W. A. McTAVISH, Medical Officer of Health, Garden Bay, British Columbia.
Dr. W. S. MILLYARD, Medical Officer of Health, Cobocok, Ontario.
Dr. E. F. MOORE, Medical Officer of Health, Canso, Nova Scotia.
Dr. A. R. REID, Medical Officer of Health, Windsor, Nova Scotia.
Dr. W. G. REIVE, Medical Officer of Health, Welland, Ontario.
Dr. GEORGE WALTER ROGERS, Dauphin, Manitoba, Member of the Provincial Board of Health.
Dr. A. B. RUTHERFORD, Medical Officer of Health, Owen Sound, Ontario.
Dr. F. S. RUTTAN, Medical Officer of Health, Woodstock, Ontario.
Dr. H. A. A. SIMPSON, Medical Officer of Health, Kintail, Ontario.

J. T. PHAIR, *Secretary.*

REPORT OF THE PUBLIC HEALTH EDUCATION SECTION

AT the thirtieth annual meeting of the Canadian Public Health Association, held in the City of Quebec in June 1941, the following resolution was adopted:

"Be it resolved that health education, as one of the important phases of community health, should have a better-established place on the curriculum of teacher-training institutions, and that the importance of an adequate program of health education in these institutions be brought to the attention of the Departments of Health and Education and to the proper authority in each such institution."

Copies of this resolution, together with the report of the Committee's findings as published in the Canadian Public Health Journal (1941, 32: 378), have been forwarded to each of the teacher-training institutions and the provincial departments of health and education.

A study is being conducted of the curricula in the field of health education in the Normal schools in the various provinces and an outline of health curricula in the elementary schools is being prepared. It is hoped that the report will show whether the Normal school work actually covers the field of health as it should be taught in the elementary schools. Considerable progress has been made and it is hoped that the report will be issued when more complete information has been obtained.

STEWART MURRAY, *Chairman.*

A. MARGUERITE SWAN, *Secretary.*

PUBLIC HEALTH ADMINISTRATION

A COMMUNITY DOCTOR SERVICE

THE Canadian Red Cross Society, Ontario Division, in consultation with the Ontario Medical Association and the Department of Health, has inaugurated a Community Doctor Service which includes a plan of prepayment for medical care and which will be of interest to public health workers because it places emphasis on the practice of preventive medicine.

This Service has been introduced as an emergency measure during the present wartime scarcity of doctors, to assist rural and isolated communities to obtain the services of general practitioners. Over 25 per cent of the doctors in Ontario have enlisted in the Forces or volunteered for other war services. Although this depletion of doctors is affecting all parts of the province, the consequences have worked real hardship in some rural areas where no substitute could be found. Already two appointments have been made and two others are approved.

The financial arrangements are such as to assure the doctor a reasonable standard of living. A minimum income of four thousand dollars is guaranteed by the Ontario Division of the Red Cross. To apply against this are dues from subscribers, fees from private practice to residents who are non-subscribers, and municipal grants. Additional income may be derived from services to workmen under the Compensation Act, from attendance upon tourists and other non-residents, and from other sources.

The basis of service is general practice. The Community Doctor is the sole judge of what this includes, but no extra fees can be charged for any "added" service to a subscriber. The doctor provides his own transportation to home and hospital which must be within twenty-five miles. Patients provide their own drugs and supplies, ex-

cept for emergency and office care. Provision is made for locum tenens for a two-week holiday at the expense of the administration and for leave of absence for post-graduate study at the expense of the Community Doctor. As far as possible, the usual patient-doctor relationship is maintained and the administration does not interest itself in the diagnosis or treatment.

This last-mentioned provision is possible because of the voluntary aspect of the plan. Before the introduction of a new service and once each year thereafter, a family-to-family canvass is made for subscribers by the local Red Cross. Although dues are paid on a per caput basis, families which choose to become subscribers must participate as a unit. However, reduced rates are offered to families with many dependent children and no charge is made for the sixth and additional child. Families who do not subscribe in advance have to wait thirty days (maternity, nine months) for service. Non-subscribers are related to the plan only with respect to the guaranteed income.

Emphasis on prevention arises from the prepayment feature and the appointment of the Community Doctor as Medical Officer of Health. The former encourages early consultation and the doctor's duties are understood to include prenatal and infant welfare care, immunization, and school health as well as the usual attention to municipal sanitation. Already there is evidence that the doctor early realizes that his efforts towards the prevention of disease are more than repaid in the reduced need for remedial care. Many entertain the hope that eventually all Community Doctors will have the assistance of a public health nurse. In the case of the two locations to which Community Doctors have been appointed, the proximity of a Red Cross Outpost makes possible this assistance, a circumstance which increases tre-

mendously the potentialities for improved community health.

When to the emphasis on preventive medicine is added the voluntary aspects of the prepayment feature, and the provision for centralized supervision, considerable promise of success is given to the entire experiment. Unlike the municipal doctor plan, a patient is free to choose his own "family physician" and no one need support the project if, because of location or other factors, he prefers an "outside" physician. Municipal politics and disgruntled taxpayers are eliminated. The doctor is protected against unreasonable complaints and the patients are assured of the services of a well-chosen physician. The project has adequate financial protection and with direction by Provincial health officials and representatives of the medical profession, a sound, careful administration is assured.

Every student of rural health is aware of the need of improved medical and public health facilities in the outlying sections of the Province. It is the hope of the sponsors of this emergency experiment that some contribution will be made to the problem by the Red Cross Community Doctor Service.—W. S. CALDWELL, M.D., Supervisor of Health Services, The Canadian Red Cross Society (Ontario Division), Toronto.

ADDITIONS TO THE STAFF OF THE DEPARTMENT OF HEALTH AND PUBLIC WELFARE OF MANITOBA

DURING the past few months several additions have been made to the professional staff of the Department of Health and Public Welfare of Manitoba.

Dr. C. E. Mather, who received the Diploma in Public Health at the School of Hygiene, University of Toronto, last year, has returned to Manitoba to be Director of the Division of Local Health Services.

Dr. George Baldry, who also received the Diploma in Public Health at Toronto last year, has taken over the direction of the Department of Industrial Hygiene in the Division of Environmental Sanitation.

Mr. William Ward has been loaned from the Division of Industrial Hygiene, Department of Pensions and National Health, Ottawa, to assist in the setting up of a laboratory for service in the industrial field.

PHYSICIANS ENROLLED AT THE SCHOOL OF HYGIENE UNIVERSITY OF TORONTO

THE following physicians are enrolled in the course leading to the Diploma in Public Health at the School of Hygiene, University of Toronto: Dr. N. Asselin, Mont Laurin, Que.; Dr. D. L. Auger, Acton Vale, Que.; Dr. R. H. Baker, Harrow, Ont.; Dr. J. Beauvilliers, Montreal, Que.; Dr. R. Beauvilliers, Drummondville, Que.; Dr. J. H. R. Bourassa, Ste. Gertrude, Que.; Dr. J. R. J. Card, Ayton, Ont.; Dr. J. L. Chenel, St. Anselme, Que.; Dr. B. Fortin, Chicoutimi, Que.; Dr. Charlotte M. Horner, Toronto, Ont.; Dr. R. G. Knipe, Vancouver, B.C.; Dr. A. Laberge, Amos, Que.; Dr. M. R. Macdonald, Reserve Mines, N.S.; Dr. G. E. Moodie, Wales, Ont.; Dr. A. F. W. Peart, Toronto, Ont.; Dr. B. Roy, Beauceville, Que.; Dr. R. G. Struthers, Toronto, Ont.; and Dr. E. J. Valentine, Kingston, Jamaica.

CURRENT HEALTH LITERATURE

Minimizing the After Effects of Acute Poliomyelitis: A Rationalization of the Kenny Treatment

THIS discussion of the Kenny treatment of acute poliomyelitis and the newer concepts on which it is based is of the greatest practical interest. Muscular dysfunction, as outlined by the author, is due to several causes; first, pathology of anterior horn cells arising from oedema, perivascular infiltration, petechial haemorrhages and the direct effect of the virus on motor neurones. The amount of destruction of anterior horn cells is variable but is rarely so complete as to cause total loss of function in any muscle and the end result depends on the conservation of the residual function. The second cause, spasm, has an important bearing on the outcome at this point, causing dysfunction of the muscle in spasm and its antagonist. Spasm is increased by pain and tenderness, attempts at active motion, forced immobilization in casts or splints, and by massage and electrical stimulation. If untreated, spasm may bring about various forms of damage to a muscle and result in permanent contracture and loss of function. The third cause, muscle incoordination, arises as a result of the disturbances brought about by the first two and consists of a loss of ability to use muscles in proper relationship to one another and to the work to be done, such as attempting to substitute an inefficient or unsuitable muscle for one that is weakened or in spasm. The fourth cause is termed mental "alienation" in the Kenny nomenclature, and simply means that for certain reasons, such as inhibition due to pain, the patient has lost the power to operate surviving motor neurons normally. Only the first cause of muscular dysfunction is irremediable and permanent, and usually only a fraction of the motor units in any given muscle are destroyed. The Kenny treatment is designed to

prevent further damage by relieving the effects of spasm, muscle incoordination, and mental "alienation". Surviving motor units are believed capable of undergoing a compensatory hypertrophy so that muscles apparently seriously involved may show no apparent permanent loss of function. The early treatment consists almost solely of the application of hot fomentos or compresses to indicated muscles or muscle groups for relief of spasm and tenderness. When this has been accomplished, passive movements of involved muscles are started to establish or maintain mental awareness of its function. Active motion and muscle re-education are commenced when spasm and tenderness are not increased thereby.

Other measures important in the care of poliomyelitis patients to ensure maximum recovery are rest and quiet, the combating of toxicity as by the intravenous administration of 10 per cent dextrose, and the maintenance of morale so that those with permanent damage will regard themselves as restricted rather than handicapped.

Philip Moen Stimson, J.A.M.A., 1942, 119: 989.

Nasal Insufflation of Sulfathiazole Powder for Diphtheria Carriers

TWELVE individuals ranging in age from 8 months to 6 years and carrying virulent diphtheria bacilli over periods of from 10 days to 4 months were treated with sulfathiazole powder by nasal insufflation. Repeated negative swabs were obtained in 11 of the 12 carriers, the average time required being 5 days. Four months later 5 cases were reswabbed and were still negative.

A description is included of the method used, including the type of insufflator, the "nasal piece", and the routine of treatment.

J. Goldman and W. H. Patterson, Brit. Med. J., 1942, May 23, p. 641.

Poliomyelitis and Encephalitis, Manitoba, 1941

*T*he story of the twin epidemics of encephalitis and poliomyelitis which occurred in the Province of Manitoba last year:

PART I

The Epidemiology of Poliomyelitis and Encephalitis.

PART II

The Diagnosis, Pathology, and Treatment of Poliomyelitis.

PART III

The Diagnosis, Pathology, and Treatment of Encephalitis.

Reprinted from the June 1942 issue of the
CANADIAN PUBLIC HEALTH JOURNAL

80 pages—35 cents

CANADIAN PUBLIC HEALTH ASSOCIATION
111 AVENUE ROAD, TORONTO, ONTARIO

Especially these days . . . a man needs a good meal

IN PEACETIME, you owe it to yourself and your family to eat well-balanced, nourishing meals. In critical times like these, it's a patriotic duty.

The food you eat is the fuel which your body turns into energy—the energy needed for everything you do, physical and mental.

Your food supplies your body with the materials which build it and keep it in repair.

From your food, your body also gets the elements which help to protect it from disease and keep it running smoothly.

Everyone—desk worker, industrial worker, home worker—needs each day a varied selection of the right foods: milk, vegetables, fruits, eggs, meat or fish or poultry, cereals and breads, and fats. From these foods your body can obtain the nourishment it requires. Naturally, the amount of food you require varies with your activity. If your work is hard you can eat more of the foods high in energy value—bread, cereals, potatoes, fats, cheese and dried beans.

Almost as vital as the right kind of food is the way the food is divided among the meals of the day. It takes satisfying, well-balanced breakfasts and nourishing lunches to supply you with enough energy to last until the next meal. Hasty, sketchy meals may let you down and result in unnecessary fatigue and mental depression. In industrial plants, even your safety may depend on meals that maintain energy throughout working hours.

Nourishing meals not only help you feel

better—they help you do better work and do it more easily. Even your spirits improve and you get more fun from leisure hours. Better eating habits can also build up your resistance to the illnesses which may become more widespread in times of war.

Housewives can do much to see that the members of their families get the nourishing meals they need. Where workers are on night shifts, it is important to arrange meals so that both the workers and the family have nutritious, satisfying meals at the right times. Try to arrange at least one meal so that the whole family may eat together.

To help you select the right amounts of the right foods, Metropolitan will send you free on request the booklets, "Metropolitan Cook Book" and "Food for Health in Peace and War." Write Booklet Department 9-J-42, Canadian Head Office, Ottawa.



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